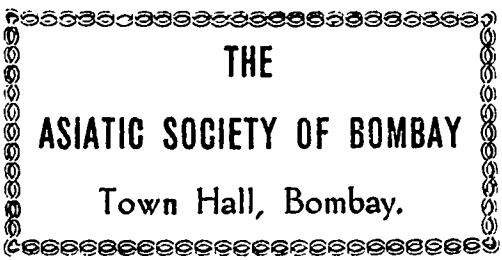

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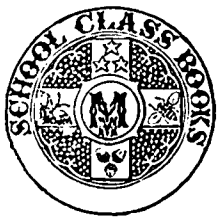


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THE STUDENT'S FLORA

OF THE

BRITISH ISLANDS.


SCHOOL CLASS BOOKS

THE STUDENT'S FLORA

OF THE

British Islands.

54692

BY

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PREFACE.

The object of this work is to supply students and field-botanists with a fuller account of the Plants of the British Islands than the manuals hitherto in use aim at giving.

For the number and kinds of plants introduced as composing the British Flora proper, I have been guided by the "London Catalogue of British Plants," 6th ed., 1867; being fully satisfied that I should thus best serve the interests of British Botany. The difficult task of determining which of the many doubtfully indigenous or naturalized plants should be regarded as British by adoption or otherwise, or the reverse, has in the successive editions of this Catalogue been settled by the two Botanists most competent to form an opinion, not only by many years of research and thorough knowledge, but also by matured judgment in such matters; Messrs. H. C. Watson and J. Boswell Syme. It is true that I may think some of the species they have introduced have less claims than some they have rejected, but this applies to very few cases indeed. I have included but one species that is not in the Catalogue, *Claytonia perfoliata*, very lately but certainly now established as a colonist.

The Ordinal, Generic, and Specific characters have been rewritten, and are to a great extent original, and drawn from living or dried specimens or both. After working them out, I have also consulted the usual British and Continental Floras, and collated the descriptions throughout with Mr. Syme's Edition of English Botany (to the end of *Cyperaceæ*), of the

descriptions in which work I cannot speak in terms of too high praise. By this method of re-description, whilst I believe I have avoided some errors of my predecessors, I have no doubt made others of my own: such creep into all endeavours to describe most or all of the organs of many species: and if I have made many such blunders, a part may be attributable to the fact that various Genera were described amidst constant interruptions, and all under pressure of official duties.

The adoption of sub-species will, I hope, prove generally acceptable, though open to abundant criticism in details; indeed, in a good many cases this subdivision is almost purely arbitrary. In defining the sub-species I have been much guided by the views held by British Botanists, and especially as expressed in the London Catalogue.

The terminology employed is intended to be as simple as I think is attainable with a due regard to precision of language. As a rule, I have been guided in the choice of terms by Oliver's "Lessons in Elementary Botany;" and I have especially avoided terms applied to single Orders, or of special signification in single Orders or Genera. It is not easy to be consistent in this matter, in a work extending over so many different Orders, and occupying so many months in its preparation; and I fear that I may have at times forgotten my own principles. For modifications of the fruit the choice of terms presents great difficulty; and I have therefore very much confined myself to such as are required to avoid periphrasis, as capsule, drupe, berry, utricle, follicle, pod, &c. (about which there is no ambiguity), and to *achene* for the dry indehiscent carpels of an apocarpous fruit. For Grasses, Compositæ, &c. the term *fruit* is itself sufficiently explicit, its nature being always explained in the Ordinal description. The term *nutlet* for the parts of the fruit of *Borragineæ* and *Labiatæ* I have borrowed from Asa Gray.

The Keys to the Genera are naturally arranged, but in *Umbelliferæ* I have added an artificial key, as essential for the determination of a Genus before the whole Order has been studied. I have added no keys to the Species, preferring curt diagnoses which embrace the more

important characters of the plant; finding, moreover, from experience, that such keys promote very superficial habits amongst students.

For the areas and elevations inhabited by the Species in the British Isles I am wholly indebted to Mr. Watson's accurate works, and especially to his (unfortunately unpublished) "Compendium of the Cybele Britannica," 1868-9. The limits of the more or less local Species are here defined by the counties, and the addition of northwards or southwards indicates that they extend to Caithness and Sutherland, and to Cornwall and Kent, respectively. When a plant is remarkable for its absence in Ireland, this is stated; and when rare or local in Ireland, its limits are taken from the "Cybele Hibernica" of More and Moore, a standard work. Of the altitudes, I have chosen the highest the Species attains, and indicated the region where this is the case; where no elevation is given, the Species is not known to ascend to 1,000 feet, and may be assumed to be a "low-ground" plant. To the doubtfully indigenous Species I have added Watson's opinion as to whether they are "colonists" or "denizens," &c. The extra-British distributions I had worked out myself for most of the British plants before the appearance of Mr. Watson's "Compendium;" I have, however, revised them by means of the latter work with great advantage.

The estimates of the numbers of Genera in the Orders, and of Species in the Genera, are compiled from the Kew Herbarium, and from many other sources, and are unavoidably very vague; they serve to indicate to the student the relative extent of these groups. The notices of their affinities and properties are necessarily extremely brief indications. The etymologies I have endeavoured to reduce to really useful limits. Only such English names as are pretty well known are given, and for these I have in many cases been guided by Dr. Alexander-Prior's "Popular Names of British Plants," a very good book.

I am greatly obliged to Mr. J. G. Baker for an account of the Genera *Rubus*, *Rosa*, and *Hieracium*, and wish that I had enlisted his services for the aquatic *Ranunculi*, of which I have admitted too many Sub-species.

I am also indebted to him and to Professor Oliver for the careful revision of the proof-sheets, and for many valuable facts, opinions, and suggestions during the progress of the work.

When I commenced this FLORA, it was my intention to have made it a record of those physiological and morphological observations on British plants which have of late given so great an impulse and zest to botanical pursuits; and towards which I was offered much assistance from my friends Mr. Darwin, Professor Oliver, and Professor Dickson of Glasgow; and this intention was my chief inducement to undertake the work. I had, however, made but little progress before I discovered that the number of such observations was so great, and that the value, accuracy, and interpretation of many were so much disputed, that to make even a small selection from them would be a very difficult task, and would have filled a volume far exceeding the dimensions required for students. I do not, however, abandon the hope of being able at some future time to undertake such a task, in the form of a Companion to the STUDENT'S FLORA.

ROYAL GARDENS, KEW,
May 1, 1870.

SYNOPSIS OF THE NATURAL ORDERS

(ADAPTED TO THE BRITISH GENERA).

THE arrangement here adopted adheres very closely to the Jussieuan as modified by De Candolle, which, notwithstanding its many defects (inseparable from a linear arrangement), is, I think, as good as any of those subsequently proposed,* and has the great advantage of being that most generally adopted in the Universities and Schools of Great Britain and America, and in systematic works everywhere. Its great defect is the necessity of an Apetalous division, embracing a heterogeneous mass of Orders, which have rarely any mutual affinities, and are incapable of being naturally grouped. Some of these are obviously allied to Polypetalous or Monopetalous Orders, but cannot be placed in contiguity with these without interfering with other and closer alliances; some again present cross affinities with two or more often distant Orders; and the greater proportion have no ascertained affinities. Under these circumstances, and seeing how much the retention of the Apetalous division facilitates the often difficult task of finding the Natural Order of a plant, it appears to me to be premature to depart from the Jussieuan system.

CLASS I. DICOTYLE'DONS.

Stem when perennial, with pith, one or more concentric layers of woody tissue and a separable bark. *Leaves* usually net-veined. Whorls of the *perianth* in 4's or 5's. *Embryo* with 2 cotyledons; the radicle itself usually elongating in germination.

DIVISION I. Polypet'alæ.

Flowers with both calyx and corolla (dichlamydeous). *Petals* free. (See also the exceptional *Monopetalæ*.)

Exceptions: Flowers wanting either calyx or corolla occur in: 1, RANUNCULACEÆ; 6, CRUCIFERÆ (5 *Cardamine*, 16 *Senebiera*, and 17 *Lepidium*); 9, VIOLACEÆ (apetalous forms of *Viola*); 12, CARYOPHYLLEÆ (8 *Arenaria* § *Cherleria*, 9 *Sagina*); 14, PARONYCHIEÆ (2 *Herniaria*, 4 *Scleranthus*); 27, ROSACEÆ (8 *Alchemilla*, 10 *Poterium*); 28, SAXIFRAGEÆ (2 *Chrysosplenium*); 31, HALORAGEÆ; 32, ONAGRARIEÆ (2 *Ludwigia*); 33, LYTHRACEÆ (2 *Peplis*).

* Of these the principal are: that of Brongniart, adopted in the Paris Schools; of Endlicher, in many of the German Schools; of Fries, by various botanists in Scandinavia; and of Lindley ("The Vegetable Kingdom"), which has been partially followed in England and India alone.

Petals more or less adherent or coherent occur in: 5, FUMARIACEÆ; 10, POLYGALEÆ; 13, PORTULACEÆ; 14*, TAMARISCINEÆ; 17, MALVACEÆ; 21, ILICINEÆ; 29, CRASSULACEÆ (2 *Cotyledon*); 30, CUCURBITACEÆ.

SUB-DIVISION 1. **Thalamiflo'ræ.** *Stamens* inserted on the receptacle (hypogynous) free from the calyx, or on a disk that terminates the pedicel. *Ovary* superior.

Exceptions. Stamens apparently perigynous or epigynous in 3 *Nymphæaceæ* (1 *Nymphæa*) and 14 *Paronychieæ*. See also 30 *Droseraceæ*; *Parnassia* in 28 *Saxifrageæ*; and 44 *Ericaceæ*.

* *Pistil apocarpous, carpels* 1 *or more; ovules sutural or basal.* (*See also* 17 Malvaceæ *and* 20 Geraniaceæ.)

1. RANUNCULACEÆ. *Flowers* regular or irregular. *Stamens* indefinite; anthers basifixed, opening by slits. *Seeds* albuminous.—Herbs with alternate leaves (except *Clematis*). (p. 1.)

2. BERBERIDEÆ. *Flowers* regular, 3-merous. *Stamens* definite, opposite the petals; anthers basifixed, opening by recurved valves. *Seeds* albuminous.—Shrubs; leaves alternate; flowers often showy. (p. 12.)

** *Pistil syncarpous,* 1*-celled* (*except* 3 Nymphæaceæ), *or* 2*-celled by a membranous septum; ovules parietal, rarely basal.*

3. NYMPHÆACEÆ. *Flowers* regular. *Stamens* indefinite; anthers basifixed. *Ovary* many-celled; *ovules* scattered over the walls of the cells; stigmas sessile. *Seeds* albuminous.—Water-herbs; flowers showy. (p. 13.)

4. PAPAVERACEÆ. *Flowers* regular, 2-merous. *Stamens* indefinite; anthers basifixed. *Ovules* parietal or on the surfaces of partial dissepiments; style 1 or stigmas sessile. *Seeds* albuminous.—Herbs; juice milky; leaves alternate, exstipulate; flowers usually showy. (p. 14.)

5. FUMARIACEÆ. *Flowers* irregular. *Sepals* 2. *Petals* 4. *Stamens* 6 in 2 bundles. *Ovary* 1-celled; ovules many parietal, or 1 (by suppression) basal; style 1 or 0. *Seeds* albuminous.—Weak herbs with exstipulate alternate leaves; flowers usually small. (p. 17.)

6. CRUCIFERÆ. *Flowers* usually regular. *Sepals* 4. *Petals* 4. *Stamens* usually 6, 4 longer than the others. *Ovary* 1–2-celled, of 2 carpels; ovules parietal; style 1 or 0. *Seeds* exalbuminous.—Herbs; leaves exstipulate, alternate; flowers usually small and ebracteate. (p. 19.)

7. RESEDACEÆ. *Flowers* irregular. *Sepals* and *petals* 4–7 each. *Stamens* indefinite. *Ovary* 1-celled, of 2–6 carpels, at length open at the top; ovules parietal; stigmas sessile. *Seeds* exalbuminous.—Herbs; leaves alternate, stipules glandular or 0; flowers small, greenish. (p. 41.)

8. CISTINEÆ. *Flowers* regular. *Sepals* 3–5. *Petals* 5. *Stamens* indefinite. *Ovary* 1-celled, of 3 carpels; ovules parietal; styles 3. *Seeds* albuminous.—Shrubs; leaves usually stipulate; flowers yellow or red, showy; petals fugacious. (p. 42.)

9. VIOLACEÆ. *Flowers* irregular. *Sepals*, *petals*, and *stamens* 5 each. *Ovary* 1-celled; ovules parietal; style 1. *Capsule* 3-valved, loculicidal. *Seeds* albuminous.—Herbs; leaves alternate, stipulate; flowers often showy. (p. 43.)

11. FRANKENIACEÆ. *Flowers* regular. *Sepals*, *petals*, and *stamens* 4–6 each. *Ovary* 1-celled, of 2–5 carpels; ovules parietal; style 1.—A littoral herb; leaves opposite, exstipulate; flowers small. (p. 47.)

*** *Pistil syncarpous, 1-celled; placenta free-central or basal.*

12. CARYOPHYLLEÆ. *Flowers* regular. *Sepals* and *petals* 4 or 5 each. *Stamens* 8 or 10. *Ovules* many; styles 2–5. *Seeds* albuminous; embryo curved.—Herbs; leaves opposite, stipulate or not; flowers usually small and pink or white. (p. 48.)

13. PORTULACEÆ. *Flowers* regular. *Sepals* 2. *Petals* 4 or more. *Stamens* 3 or more. *Ovules* 2 or more; style 1, 2-3-fid. *Seeds* albuminous; embryo curved.—Herbs; leaves opposite or alternate, quite entire; flowers small. (p. 63.)

14. PARONYCHIEÆ. *Flowers* regular. *Sepals* 4–5. *Petals* 4–5 or 0. *Stamens* 1–5. *Ovule* 1; style 1, 2–3-fid. *Seeds* albuminous; embryo usually curved.—Herbs; leaves opposite or alternate, stipulate or not, quite entire or serrulate; flowers small or minute. (p. 64.)

14*. TAMARISCINEÆ. *Flowers* regular. *Sepals* and *petals* 4–5 each. *Stamens* 4 or more. *Ovules* 2 or more; styles 3–4.—Shrubs; leaves minute, exstipulate; flowers small. (p. 66.)

**** *Pistil syncarpous, 2- or more-celled; placentas axile.*

10. POLYGALEÆ. *Flowers* irregular. *Inner sepals* petaloid. *Petals* adnate to the staminal sheath. *Stamens* 8; anthers 1-celled. *Ovary* 2-celled, 2-ovuled; style 1.—Herbs; leaves alternate or subopposite, exstipulate; flowers small, usually blue. (p. 46.)

15. ELATINEÆ. *Flowers* regular. *Sepals* and *petals* 3–4 each. *Stamens* 3–4 or twice as many, free. *Ovary* 2–5-celled; styles 2–5. *Seeds* minute; albumen scanty or 0.—Water-herbs; leaves opposite, stipulate; flowers minute. (p. 67.)

16. HYPERICINEÆ. *Flowers* regular. *Sepals* and *petals* 5 each. *Stamens* many, united in bundles. *Ovary* more or less completely 3–5-celled, cells many-ovuled; styles 3–5. *Seeds* exalbuminous.—Herbs or shrubs; leaves opposite, often gland-dotted, exstipulate; flowers often showy, yellow. (p. 68.)

17. MALVACEÆ. *Flowers* regular. *Sepals* 5, valvate. *Petals* 5, convolute in bud, adnate to the staminal tube. *Stamens* monadelphous; anthers 1-celled. *Ovary* many-celled, cells 1-ovuled (in British genera). *Albumen* scanty or 0; embryo crumpled.—Herbs or shrubs; leaves alternate, stipulate; flowers often showy. (p. 70.)

18. TILIACEÆ. *Flowers* regular. *Sepals* 5, valvate. *Petals* 5. *Stamens* indefinite; anthers 2-celled. *Ovary* 2–10-celled; cells 2-ovuled; style 1. *Seeds* albuminous.—Trees; leaves alternate, stipulate; flowers not showy. (p. 72.)

19. LINEÆ. *Flowers* regular. *Sepals* 4–5. *Petals* 4–5, convolute in bud. *Stamens* usually 4–5. *Ovary* 3–5- (–10-) celled, cells 1–2-ovuled; styles 3–5. *Seeds* albuminous.—Herbs; leaves opposite or alternate, narrow, quite entire, exstipulate; flowers usually showy. (p. 73.)

20. GERANIACEÆ. *Flowers* regular or not. *Sepals* 3–5. *Petals* 3–5,

imbricate in bud. *Stamens* definite. *Ovary* 3–5-lobed and -celled; cells 1–many-ovuled; styles 1 or more. *Albumen* scanty or 0; cotyledons plaited or convolute.—Herbs; leaves opposite or alternate, usually stipulate; flowers often showy. (p. 75.)

21. ILICINEÆ. *Flowers* regular. *Sepals* 4–5. *Petals* 4–5, often connate, imbricate in bud. *Stamens* 4–5. *Ovary* 3–5-celled, cells 1–2-ovuled. *Seeds* albuminous.—Shrubs; leaves evergreen, alternate, exstipulate; flowers small. (p. 80.)

22. EMPETRACEÆ. *Flowers* regular, diœcious. *Sepals* 3. *Petals* 3, imbricate in bud. *Stamens* 3. *Ovary* 3–9-celled, cells 1-ovuled. *Seeds* albuminous.—Small shrubs; leaves evergreen, alternate, exstipulate; flowers inconspicuous. (p. 81.)

SUB-DIVISION 2. **Calyciflo'ræ.** *Stamens* inserted on the calyx or disk (perigynous or epigynous).—See also the exceptional *Thalamiflorœ*.

Exceptions. Stamens hypogynous in 28 SAXIFRAGEÆ (3 *Parnassia*), and in 30 DROSERACEÆ; epipetalous in some 29 CRASSULACEÆ; obscurely perigynous in 26 LEGUMINOSÆ.

* *Ovary superior (except some* Rosaceæ *and* Saxifrageæ). *Stamens perigynous.*

23. CELASTRINEÆ. *Flowers* regular. *Calyx* 4–5-lobed, and *petals* 4–5, both imbricate in bud. *Stamens* 4–5, inserted on the disk. *Ovary* 3–5-celled, cells with 2 erect ovules. *Seeds* arillate; cotyledons foliaceous.—Trees or shrubs; leaves various; flowers small. (p. 81.)

24. RHAMNEÆ. *Flowers* regular. *Calyx* 4–5-lobed, valvate in bud. *Petals* 4–5, minute. *Stamens* 1 opposite each petal, inserted on the calyx-tube at the edge of the disk. *Ovary* 3-celled; ovule 1 erect in each cell.—Shrubs; leaves alternate or opposite, stipules small; flowers inconspicuous. (p. 82.)

25. SAPINDACEÆ, *Tribe* ACERINEÆ. *Flowers* regular. *Calyx* 4–9-lobed, and *petals* 4–9, both imbricate in bud. *Stamens* 8–12, inserted on the disk. *Ovary* 2-lobed and -celled; cells 2-ovuled. *Fruit* a samara; cotyledons plaited.—Trees or shrubs; leaves opposite; flowers rather small, green. (p. 83.)

26. LEGUMINOSÆ. *Flowers* irregular, papilionaceous. *Stamens* 10, subhypogynous or inserted on the calyx-tube, all or 9 of them combined. *Ovary* of 1 carpel. *Fruit* a legume. *Albumen* 0.—Herbs or shrubs; leaves usually alternate compound and stipulate. (p. 84.)

27. ROSACEÆ. *Flowers* regular. *Calyx* 4–5- (rarely 8–9-) lobed, imbricate or valvate in bud. *Petals* 4–5 (rarely 8–9 or 0), imbricate in bud. *Stamens* usually indefinite, inserted on the calyx-tube or disk, incurved in bud. *Ovary* of 1 or more free or connate 1- or more-ovuled carpels. *Fruit* various. *Albumen* 0.—Herbs or shrubs; leaves usually alternate, stipulate; flowers often showy. (p. 105.)

28. SAXIFRAGEÆ. *Flowers* regular. *Calyx* 4–5-lobed. *Petals* 4–5, rarely 0, imbricate in bud. *Stamens* definite. *Carpels* fewer than the petals, usually 2 connate; placentas axile, rarely parietal. *Fruit* various. *Seeds* albuminous.—Herbs or shrubs; leaves opposite or alternate, stipulate or not; flowers small. (p. 128.)

29. CRASSULACEÆ. *Flowers* regular. *Calyx* 4–12-lobed. *Petals* 4–12. *Stamens* twice as many as the petals (except 1 *Tillæa*). *Fruit* follicular. —Herbs; leaves succulent, exstipulate; flowers small. (p. 135.)

30. DROSERACEÆ. *Flowers* regular. *Sepals* and *petals* 5, imbricate in bud. *Stamens* as many, hypogynous or perigynous. *Ovary* 1-celled; ovules many, parietal. *Fruit* capsular. *Seeds* albuminous.—Glandular herbs; leaves radical; flowers small, white or pink. (p. 139.)

33. LYTHRACEÆ. *Flowers* regular. *Calyx-lobes* 3–6, valvate in bud. *Petals* 3–6, crumpled in bud. *Stamens* definite. *Ovary* 2–6-celled, cells many-ovuled. *Capsule* many-seeded. *Seeds* exalbuminous.—Herbs; leaves opposite or whorled, quite entire, exstipulate; flowers often showy. (p. 146.)

** *Ovary inferior. Stamens epigynous.*

31. HALORAGEÆ. *Flowers* usually apetalous and 1-sexual. *Calyx-lobes* 2–4, valvate in bud, or 0. *Stamens* 1 or more, definite. *Ovary* 1–4-celled, cells 1-ovuled. *Seeds* albuminous.—Herbs, often marsh or aquatic; leaves opposite alternate or whorled, exstipulate; flowers very inconspicuous. (p. 140.)

32. ONAGRARIEÆ. *Flowers* usually regular. *Calyx-lobes* 2 or 4, valvate in bud. *Petals* 2 or 4, twisted in bud. *Stamens* definite. *Ovary* 1–4-celled, cells 1-many-seeded. *Seeds* exalbuminous.—Herbs; leaves opposite or alternate, exstipulate; flowers often showy. (p. 142.)

34. CUCURBITACEÆ. *Flowers* regular, 1-sexual. *Calyx* 5-toothed. *Corolla* 5-lobed. *Stamens* 3. *Ovary* 3-celled, many-ovuled. *Fruit* a berry. *Seeds* exalbuminous.—Herbs with tendrils; leaves alternate, exstipulate; flowers showy or not. (p. 148.)

35. UMBELLIFERÆ. *Flowers* usually regular. *Calyx-lobes* 5 or 0. *Petals* 5. *Stamens* 5, incurved in bud. *Ovary* 2-celled; styles 2; ovules solitary. *Fruit* of 2 separable indehiscent dry carpels. *Seeds* albuminous.—Herbs; leaves alternate; flowers usually umbelled, small. (p. 149.)

36. ARALIACEÆ. *Flowers* of *Umbelliferæ*, but shrubs or trees; ovary of often more than 2 carpels, and fruit a berry.—Leaves alternate; flowers usually green. (p. 171.)

37. CORNACEÆ. *Flowers* regular. *Calyx-lobes* 5 or 0. *Petals* 4–5. *Stamens* 4–5. *Ovary* 2-celled, cells 1-ovuled; style simple. *Drupe* 1–2-celled. *Seeds* albuminous.—Herbs, shrubs, or trees; leaves opposite; flowers usually small. (p. 172.)

DIVISION II. **Monopet'alæ** or **Gamopet'alæ.**

Flowers with both calyx and corolla (dichlamydeous); petals more or less connate into a 2- or more-lobed corolla.—See also various monopetalous genera under the exceptional *Polypetalæ.*

Exceptions: Petals free in 44 ERICACEÆ (11 *Pyrola* and 12 *Monotropa*) and 59 PLUMBAGINEÆ. Corolla absent in 45 OLEINEÆ (2 *Fraxinus*), and 58 PRIMULACEÆ (4 *Glaux*).

1. *Ovary* inferior.—(See also 58 PRIMULACEÆ (8 *Samolus*) in 2.)

* *Stamens epipetalous; see also* 43 CAMPANULACEÆ (1 Lobelia).

38. CAPRIFOLIACEÆ. *Flowers* regular or not. *Corolla-lobes* valvate or imbricate in bud. *Ovary* 1–5-celled, cells 1- or more-ovuled. *Seeds* albuminous.—Shrubs, rarely herbs; leaves opposite, exstipulate; flowers usually showy. (p. 173.)

39. RUBIACEÆ, *Tribe* STELLATÆ. *Flowers* regular. *Corolla-lobes* valvate in bud. *Ovary* 2-celled; cells 1-ovuled. *Seeds* albuminous.—Herbs; leaves whorled or opposite, exstipulate; flowers small or minute. (p. 176.)

40. VALERIANEÆ. *Flowers* irregular. *Corolla-lobes* imbricate. *Stamens* 1–3 or 5, free. *Ovary* 1–3-celled, one cell 1-ovuled; ovule pendulous. *Seeds* exalbuminous.—Herbs; leaves opposite; flowers small. (p. 181.)

41. DIPSACEÆ. *Flowers* regular or not, in involucrate heads. *Corolla-lobes* imbricate. *Stamens* 4. *Ovary* 1-celled; ovule 1, pendulous. *Seeds* albuminous.—Herbs; leaves opposite, exstipulate; flowers small. (p. 183.)

42. COMPOSITÆ. *Flowers* in involucrate heads. *Corolla-lobes* valvate. *Stamens* 4–5; anthers usually connate. *Ovary* 1-celled; ovule 1, erect. *Seeds* exalbuminous.—Herbs, rarely shrubs; leaves various, exstipulate; flowers small or minute. (p. 184.)

** *Stamens inserted on the top of the ovary.*

43. CAMPANULACEÆ. *Flowers* regular or irregular. *Stamens* 5, free or connate. *Ovary* 2–8-celled, cells many-ovuled.—Herbs; juice milky; leaves alternate, exstipulate; flowers usually showy. (p. 224.)

44. ERICACEÆ, *Suborder* VACCINIEÆ. *Flowers* regular. *Stamens* 8 or 10. *Ovary* 4–5-celled.—Slender shrubs; leaves alternate and exstipulate. (p. 229.)

2. *Ovary* superior. *Stamens* epipetalous (hypogynous in some ERICACEÆ, in 52 PLANTAGINEÆ (2 *Littorella*), and in 59 PLUMBAGINEÆ).

* *Corolla regular, except sometimes in* 50 Borragineæ *and* 51 Solaneæ; *placentas axile or parietal.*

44. ERICACEÆ, *Suborder* ERICEÆ. *Stamens* usually twice as many as the corolla-lobes; anthers opening usually by pores or transversely.—Shrubs or trees, rarely herbs; leaves various, exstipulate; flowers small. (p. 229.)

45. OLEINEÆ. *Calyx* 4-fid or 0. *Corolla* 4-lobed or 0. *Stamens* 2. *Ovary* 2-celled, cells 2–3-ovuled. *Fruit* a drupe or samara.—Trees or shrubs; leaves opposite, exstipulate; flowers small. (p. 237.)

46. APOCYNEÆ. *Calyx* 4–5-fid. *Corolla* 4–5-lobed, contorted in bud. *Stamens* 4–5; anthers basifixed. *Carpels* 2, free below. *Fruit* of 2 follicles.—Shrubs; leaves opposite, quite entire; flowers often showy. (p. 238.)

47. GENTIANEÆ. *Calyx* 4–8-fid. *Corolla* 4–8-lobed, contorted in bud. *Stamens* 4–8; anthers versatile. *Ovary* 1-celled; ovules many, parietal. *Fruit* usually capsular.—Herbs; leaves opposite, quite entire (alternate, 3-foliolate in *Menyanthes*); flowers often showy. (p. 239.)

48. POLEMONIACEÆ. *Calyx* 5-lobed. *Corolla* 5-lobed, contorted in bud.

Stamens 5. *Ovary* 3-celled; stigma 3-fid. *Fruit* capsular.—Herbs; leaves pinnate, exstipulate; flowers showy. (p. 243.)

49. CONVOLVULACEÆ. *Sepals* 5. *Corolla* 5-lobed, plaited and contorted in bud. *Stamens* 5. *Ovary* 2-celled, cells 2-ovuled; stigmas 2-fid or styles 2.—Herbs; leaves alternate, simple (0 in *Cuscuta*); flowers often showy. (p. 245.)

50. BORRAGINEÆ. *Calyx* 5-lobed, valvate in bud. *Corolla* 5-lobed, imbricate in bud. *Stamens* 5. *Ovary* of 2 2-lobed 2-celled 2-ovuled carpels. *Fruit* of 4 nutlets.—Hispid or scabrid herbs; leaves alternate, quite entire, exstipulate; flowers often showy. (p. 247.)

51. SOLANEÆ. *Calyx* 5-fid. *Corolla* 5-lobed, imbricate plaited or valvate in bud. *Stamens* 5, often cohering. *Ovary* 2-celled; ovules many, axile. *Fruit* a capsule or berry.—Herbs; leaves alternate or in pairs, exstipulate; flowers small or large. (p. 255.)

52. PLANTAGINEÆ. *Sepals* 4. *Corolla* scarious, 4-lobed, imbricate in bud. *Stamens* 4; anthers pendulous. *Ovary* 2–4-celled; style and stigma filiform. *Capsule* 1–4-celled.—Herbs; leaves alternate or radical; flowers inconspicuous. (*Littorella* is altogether anomalous.) (p. 257.)

** *Corolla irregular, rarely subregular. Placentas axile or parietal.* (*See also* 50 Borragineæ *and* 51 Solaneæ.)

53. SCROPHULARINEÆ. *Calyx* 4–5-merous. *Corolla* often 2-labiate, 4-5-lobed. *Stamens* 4, didynamous, rarely 2 or 5. *Ovary* 2-celled; ovules many, axile.—Herbs; leaves various; flowers often showy. (p. 259.)

54. OROBANCHEÆ. *Sepals* 4 or 5, free or connate. *Corolla* gaping. *Stamens* 4, didynamous. *Ovary* 1-celled; ovules many, parietal.—Herbs, with alternate scales instead of leaves; flowers rather large, brown or coloured. (p. 275.)

55. LABIATÆ. *Calyx* 5-cleft or 2-lipped. *Corolla* usually 2-lipped. *Stamens* usually 4, didynamous. *Ovary* of 2 2-lobed 2-celled 2-ovuled carpels. *Fruit* of 1–4 1-seeded nutlets.—Herbs or shrubs: stems square; leaves opposite, exstipulate; flowers in opposite cymes forming false whorls, rather small. (p. 277.)

56. VERBENACEÆ. *Calyx* cleft or toothed. *Corolla* tubular, often 2-lipped. *Stamens* 4. *Ovary* not lobed, 2–4-celled; cells 1-ovuled. *Fruit* a drupe, berry, or of 1–4 nutlets.—Herbs or shrubs; leaves opposite or whorled, exstipulate; flowers small or showy. (p. 295.)

*** *Corolla regular or irregular. Ovary* 1-*celled with a free basal* 1- *or many-ovuled placenta.*

57. LENTIBULARINEÆ. *Corolla* 2-labiate. *Stamens* 2. *Capsule* 2-valved, many-seeded.—Marsh or water plants; flowers rather large for the plant. (p. 297.)

58. PRIMULACEÆ. *Corolla* regular. *Stamens* usually 5 (4–9) opposite the corolla-lobes. *Capsule* usually 5–10-valved at the top, or circumsciss, many-seeded.—Herbs; leaves various; flowers usually showy. (p. 298.)

59. PLUMBAGINEÆ. *Petals* 5, equal, free or cohering. *Stamens* 5, opposite the petals. *Utricle* 1-seeded.—Maritime (rarely alpine) scapigerous herbs; leaves broad or narrow; flowers small. (p. 304.)

DIVISION III. **Apet'alæ** or **Incomple'tæ.**

Corolla and often *calyx* absent. (For other apetalous genera see the exceptions to the *Polypetalæ* and *Monopetalæ.*

1. *Corolla* alone absent (*Monochlam'ydeæ*). *Flowers* 1-2-sexual, not in cones or catkins, except in the female of 71 CANNABINEÆ.—See also 74 CUPULIFERÆ.

* *Ovary superior,* 1-*celled* (2-*celled in* Ulmus), *usually* 1-*ovuled; stigmas* 2-3.

60. POLYGONEÆ. *Flowers* usually 2-sexual. *Sepals* 3–6, green or coloured, imbricate in bud. *Stamens* 5–8, perigynous or hypogynous. *Fruit* usually enclosed in 2 or 3 enlarged sepals. *Albumen* floury; embryo curved.—Herbs; leaves alternate; stipules sheathing; flowers small. (p. 307.)

61. AMARANTHACEÆ. *Flowers* 1-sexual. *Sepals* 3–5, subscarious, imbricate in bud. *Stamens* 1 opposite each sepal. *Utricle* 1-seeded, indehiscent. *Albumen* floury; embryo curved.—Herbs; leaves usually alternate exstipulate; flowers inconspicuous, green. (p. 314.)

62. CHENOPODIACEÆ. *Flowers* 1–2-sexual. *Calyx* 3–5-lobed, herbaceous, imbricate in bud, persistent round the fruit. *Stamens* 1–5, opposite the sepals. *Utricle* 1-seeded, indehiscent. *Albumen* floury; embryo curved.—Herbs; leaves opposite or alternate, exstipulate, or stems leafless and jointed; flowers green, inconspicuous. (p. 314.)

70. URTICEÆ. *Flowers* 1-sexual.—*Male: Calyx* 4–5-partite. *Stamens* as many as and opposite the sepals.—*Female: Calyx* tubular or 3–5-cleft. *Style* simple or 0; ovule erect. *Albumen* fleshy; embryo straight.—Herbs or shrubs; bark tenacious; leaves stipulate or not. (p. 331.)

71. CANNABINEÆ. *Flowers* 1-sexual.—*Male* panicled, with 5 sepals and 5 stamens adnate to their bases.—*Female* fl. in cones. *Sepal* 1, bract-like. *Styles* 2, subulate. *Albumen* 0; embryo curved.—Bitter herbs; leaves stipulate. (p. 333.)

72. ULMACEÆ. *Flowers* 2-sexual, fascicled. *Calyx* 4-8-fid, imbricate in bud. *Stamens* as many. *Ovary* 2-celled; styles 2, subulate; ovule pendulous. *Fruit* a samara.—Trees; leaves distichous, oblique, stipules caducous. (p. 333.)

** *Ovary superior,* 1-*celled,* 1-*ovuled; style short or slender, stigma entire.*

63. THYMELEÆ. *Calyx* tubular; lobes 4–5, imbricate in bud. *Stamens* definite, inserted in the tube. *Ovule* pendulous. *Albumen* 0 or scanty; embryo straight.—Shrubs; leaves quite entire, exstipulate; bark tenacious; flowers conspicuous, sweet-scented. (p. 322.)

64. ELÆAGNEÆ. *Calyx,* in male fl. 3–4-sepalous; in female or 2-sexual fl. tubular. *Stamens* 4–8 at the base of the sepals in the male fl. *Ovule* erect. *Albumen* 0 or scanty; embryo straight.—Shrubs with lepidote scales; leaves quite entire, exstipulate; flowers inconspicuous. (p. 323.)

*** *Ovary inferior,* 1- *or more-celled.*

65. LORANTHACEÆ. *Calyx* 4-cleft, valvate in bud. *Stamens* one adnate to each calyx-lobe. *Ovary* 1-celled; ovule 1, erect.—Parasitic shrubs; leaves quite entire, exstipulate; flowers inconspicuous. (p. 323.)

66. SANTALACEÆ. *Calyx* 3–5-lobed, valvate in bud. *Stamens* one adnate to each calyx-lobe. *Ovary* 1-celled; ovules several, pendulous from a free central placenta.—Shrubs or herbs, often root-parasites; leaves usually alternate, quite entire, exstipulate; flowers inconspicuous. (p. 324.)

67. ARISTOLOCHIEÆ. *Calyx* 3-lobed, or 1–2-lipped, valvate in bud. *Stamens* 6–12, epigynous or gynandrous. *Ovary* 4–6-celled; ovules many.—Herbs or shrubs; leaves alternate, exstipulate. (p. 325.)

2. *Calyx* and *corolla* both absent (except in *Buxus* and *Mercurialis*). (*Achlamydeæ.*) *Flowers* 1-sexual, often in a calyx-like involucre.

68. EUPHORBIACEÆ. *Male* fl.: *Calyx* 0 or *sepals* 2 or more. *Stamens* 1 or more; anthers didymous.—*Female* fl.: *Ovary* 2–3-lobed and -celled; ovules 1–2 in each cell, pendulous; styles 2–3. *Albumen* copious, fleshy.—Herbs or shrubs; leaves various; inflorescence often of many stamens and 1 pistil collected in a small calyx-like involucre. (p. 326.)

69. CERATOPHYLLEÆ. *Flowers* 1-sexual, in an 8–12-partite involucre with subulate segments.—*Male*, of many anthers.—*Female*, a 1-celled ovary, with subulate persistent style and 1 pendulous ovule.—A submerged herb, with whorled multifid leaves; flowers very inconspicuous. (p. 331).

3. *Flowers* 1-sexual; males and females or males only in catkins, spikes, or cones, with or without a perianth.—See 71 CANNABINEÆ.

73. SALICINEÆ. *Flowers* dicœcious, without perianth, both sexes in catkins.—*Male: stamens* 1 or more to each scale.—*Female: Ovary* solitary, 1-celled; stigmas 2; ovules many, parietal. *Capsule* 2-valved.—Trees; leaves alternate, stipulate; catkins conspicuous. (p. 334.)

74. CUPULIFERÆ.—*Flowers* mon-dicœcious. *Males* in catkins. *Sepals* 0 or 5 or more. *Stamens* 5–20.—*Females*, sessile in an involucre of free or connate bracts. *Calyx* superior, 5–6-toothed. *Ovary* 2–3-celled; styles 2–3; cells 1–2-ovuled. *Fruit* 1-celled, 1-seeded, dry, indehiscent, seated in the enlarged involucre.—Trees or shrubs; leaves alternate, stipulate; flowers small, green. (p. 343.)

75. BETULACEÆ. *Flowers* monœcious, in catkins.—*Male: Sepals* or *scales* 1 or more. *Stamens* one opposite each sepal.—*Female: Perianth* 0. *Ovary* 2-celled; stigmas 2, filiform; ovule 1 pendulous in each cell. *Fruit* dry, small, indehiscent.—Trees or shrubs; leaves alternate, stipulate; flowers inconspicuous. (p. 345.)

76. MYRICACEÆ. *Flowers* of both sexes in catkins; perianth 0.—*Male* of 4–8 stamens; anthers basifixed, bursting outwards.—*Female: Ovary* 1-celled; styles 2, filiform; ovule 1, basal. *Fruit* a drupe.—A glandular shrub; leaves alternate, exstipulate; flowers very inconspicuous. (p. 347.)

77. CONIFERÆ. *Perianth* 0.—*Male flowers* of 2–8-celled anthers, usually forming a deciduous catkin.—*Female fl.* of one or more naked ovules (ovaries of some) on the scales of a cone or head, or of a solitary ovule (*Taxus*). *Albumen* fleshy; embryo straight.—Trees or shrubs; leaves alternate opposite or fascicled; flowers very inconspicuous. (p. 347.)

CLASS II. MONOCOTYLE'DONS.

Stem with isolated vascular bundles scattered through the cellular tissue. *Leaves* usually parallel-veined. *Whorls of the perianth* in 3's. *Embryo* with 1 cotyledon; the radicle usually remaining undeveloped, but throwing out roots from its crown.

Exceptions. Leaves net-veined in 5 DIOSCOREÆ, 8 LILIACEÆ (1 *Paris*), and 10 AROIDEÆ (1 *Arum*). *Flowers* 4-merous in 7 NAIADEÆ, and 2-3-merous in 15 GRAMINEÆ.

DIVISION I. Petaloid'eæ.

Perianth usually petaloid, more or less brightly coloured, rarely green. *Exceptions* are very numerous, but chiefly in Orders 7 *Naiadeæ*, 9 *Juncei*, 10 *Aroideæ*, 11 *Lemnaceæ*, 12 *Typhaceæ*, and 13 *Eriocauloneæ*.

1. *Perianth* superior.

1. HYDROCHARIDEÆ. *Flowers* regular, 1-sexual. *Perianth* 6-partite, outer segments herbaceous, inner petaloid (except in *Anacharis*). *Stamens* 3 or more. *Ovary* 1- or 3-6-celled. *Fruit* a berry.—Water-plants; leaves erect or floating, flowers usually conspicuous. (p. 349.)

2. ORCHIDEÆ. *Flowers* irregular, 2-sexual. *Stamens* 1 or 2, aduate to the style. *Ovary* 1-celled. *Fruit* capsular.—Herbs of various habit. (p. 351.)

3. IRIDEÆ. *Flowers* 2-sexual. *Perianth* 6-partite, petaloid. *Stamen* 3, free; anthers bursting outwards. *Ovary* 3-celled. *Capsule* 3-valved. —Herbs; roots tuberous, or rootstock creeping; leaves narrow; flowers usually handsome. (p. 362.)

4. AMARYLLIDEÆ. *Flowers* 2-sexual. *Perianth* 6-partite, petaloid. *Stamens* 6, free; anthers bursting inwards. *Ovary* 3-celled. *Capsule* 3-valved.—Herbs; leaves narrow; flowers usually handsome. (p. 364.)

5. DIOSCOREÆ. *Flowers* 1-sexual. *Perianth* small, 6-partite, herbaceous. *Stamens* 6; anthers bursting inwards. *Ovary* 3-celled. *Berry* few-seeded.—Climbing herbs; leaves broad, with netted veins; flowers inconspicuous. (p. 366.)

2. *Perianth* inferior, or often wanting.

* *Carpels many, free, or slightly connate (solitary in various* Naiadeæ).

6. ALISMACEÆ. *Flowers* usually 2-sexual. *Perianth* 6-partite, outer segments often herbaceous and inner petaloid. *Stamens* 6. *Carpels* many. *Fruit* of many achenes; albumen 0; radicle very large.—Marsh or water herbs; leaves radical; flowers usually conspicuous. (p. 367.)

7. NAIADEÆ. *Flowers* 1-2-sexual. *Perianth* of 4 valvate sepals, or imperfect or 0. *Stamens* as many as the sepals, or fewer. *Carpels* 1-4, 1-ovuled. *Albumen* 0; radicle very large.—Marsh or water plants; leaves radical or cauline; flowers inconspicuous, green. (p. 369.)

** *Carpels solitary or connate into a 1-3-celled ovary (see 7* Naiadeæ).

8. LILIACEÆ. *Flowers* usually 2-sexual. *Perianth* usually 6-partite or of 6 pieces, and petaloid. *Stamens* one opposite each perianth-segment. *Ovary* 3-celled. *Fruit* various.—Herbs (except *Ruscus*) of various habit; flowers usually showy. (p. 377.)

9. JUNCEÆ. *Flowers* 2-sexual. *Perianth* of 6 brown, scarious segments. *Stamens* usually 6. *Ovary* 1–3-celled with 3 basilar, or many parietal or axile ovules. *Capsule* 3-valved—Rushy herbs; leaves very narrow; flowers brown, small. (p. 387.)

10. AROIDEÆ. *Flowers* sessile on a spadix, enclosed in a spathe when young, 1–2-sexual. *Perianth* 0, or of scale-like sepals. *Stamens* few or many. *Ovary* 1- or more-celled. *Berry* few- or many-seeded. *Albumen* mealy.—Herbs; leaves various, often broad, net-veined; flowers with often conspicuous spathes or spadixes. (p. 393.)

11. LEMNACEÆ. Minute floating cellular green fronds. *Flowers* imbedded in slits or cavities of the frond, most minute, 1–3 in a spathe. *Stamens* 1–2. *Ovary* 1-celled, 1–7-ovuled.—Fronds covering ponds; flowers very rare and inconspicuous. (p. 395.)

12. TYPHACEÆ. *Flowers* monœcious, in catkins or heads. *Perianth* 0, or of scales or hairs. *Stamens* many; anthers basifixed. *Ovary* 1–2-celled; style persistent; ovule 1, pendulous. *Fruit* a drupe or utricle. —Erect marsh or water plants; leaves linear; flowers small or minute, in conspicuous spikes or heads. (p. 396.)

13. ERIOCAULONEÆ. *Flowers* monœcious, in involucrate heads. *Perianth* membranous or scarious; outer of 2–3 sepals; inner 3-lobed or of 3 scales. *Stamens* 2–3 on the inner perianth-segments. *Ovary* 2–3-celled; ovule 1, pendulous in each cell. *Capsule* 2–3-valved.—Usually scapigerous, cellular, marsh or water herbs; flowers small, dull-coloured. (p. 397.)

DIVISION II. **Gluma'ceæ.**

Flowers in the axils of the scales (glumes) of spikelets. *Perianth* 0, or of a few minute scales or bristles (ovary and fruit enclosed in a perigynium in *Carex*).

14. CYPERACEÆ. *Flowers* 1–2-sexual. *Perianth* 0 or of bristles, rarely of scales. *Stamens* 1–3; anthers basifixed. *Ovary* 1-celled; style 1, stigmas 2–3 papillose; ovule 1, erect. *Fruit* compressed or 3-gonous. *Embryo* at the base of the albumen.—*Stems* usually solid, 3-gonous; leaves very slender with entire sheaths. (p. 398.)

15. GRAMINEÆ. *Flowers* usually 2-sexual. *Perianth* usually of 2 very minute scales. *Stamens* usually 3; anthers versatile. *Ovary* 1-celled; stigmas 1–2 hairy or feathery. *Fruit* terete, or grooved on one side. *Embryo* on one side of the base of the albumen.—Stem usually hollow, septate, terete; sheaths split to the base. (p. 422.)

CLASS III. **ACOTYLE'DONS** or **CRYP'TOGAMS.**

Plants with or without vascular bundles, destitute of proper flowers. (*i.e.* having no stamens, pistils, or floral whorls). Reproduction by minute bodies (*spores*), which contain no embryo.

DIVISION I. **Vasculares.**

Stems with copious bundles of vascular tissue. *Reproduction* by spores destitute of an embryo, but developing a prothallus in germination.

1. FILICES. *Capsules* usually very minute, situated on the edge or under side of the leaf (frond); rarely larger, in separate spikes or panicles. *Spores* of one kind only, developing a prothallus.—*Fronds* usually circinate in vernation. (p. 457.)

2. LYCOPODIACEÆ. *Capsules* not very minute, situated in the axils of the leaves, or of the scales of a cone. *Spores* of 1 or 2 kinds; large when present developing a prothallus; small containing antherozoids.—*Fronds* usually circinate in vernation. (p. 469.)

3. MARSILEACEÆ. *Capsules* (membranous sacs) very minute, enclosed in the cells of a globose receptacle near the base of the frond. *Spores* of 2 kinds; large developing a prothallus; small containing antherozoids.—Marsh or water plants, rarer on dry soils. (p. 471.)

4. EQUISETACEÆ. *Capsules* 2-valved, on the under side of peltate scales that are arranged in terminal cones. *Spores* of one kind only, with 4 filiform clubbed appendages rolled round them, developing a prothallus.—*Stems* erect from a creeping rootstock, terete, hollow, grooved, septate, simple or with whorled branches and toothed sheaths at the joints. (p. 472.)

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Class I. DICOTYLE'DONS.

Division I. POLYPET'ALÆ.

Order I. RANUNCULA'CEÆ.

Annual or perennial herbs, rarely shrubs. *Leaves* radical or alternate, opposite in *Clematis;* stipules 0, or adnate to the petiole. *Flowers* regular or irregular, 1–2-sexual. *Disk* 0. *Sepals* 5 or more, rarely 2–4, deciduous, often petaloid, usually imbricate in bud. *Petals* 0, or 5 or more, rarely 3, imbricate in bud, often minute or deformed. *Stamens* many, hypogynous; anthers adnate, dehiscing laterally. *Carpels* many, rarely 1, usually free, 1-celled; stigma simple; ovules 1 or more on the ventral suture, anatropous, erect with a ventral or pendulous with a dorsal raphe. *Fruit* of 1-seeded achenes, or many-seeded follicles. *Seed* small, albumen copious; embryo minute.—Distrib. Abundant in temp. and cold regions; genera 30; species 500.—Affinities. With *Berberideæ* and *Papaveraceæ;* analogies with *Alismaceæ* and *Rosaceæ.*—Properties. Usually acrid.—Exceptional Forms (British). Stem woody in *Clematis;* flowers polygamous in *Thalictrum;* pedicels bracteolate in *Aconitum;* sepals persistent in *Helleborus;* stamens few in *Myosurus;* carpels connate in *Helleborus;* follicle solitary in some *Delphinia;* berry solitary, and stigma dilated in *Actæa.*

Tribe I. **CLEMATI'DEÆ.** *Sepals* valvate. Shrubs with opposite leaves. 1. Clematis.

Tribe II. **ANEMO'NEÆ.** *Sepals* imbricate. *Achenes* with 1 pendulous seed.

Involucre 0. Sepals 4–5, petaloid. Petals 0.....2. Thalictrum.
Involucre of 3 leaves. Sepals 4–20, petaloid. Petals 0.....3. Anemone.
Involucre 0. Sepals 5–8, petaloid. Petals 5–16, conspicuous.....3*. *Adonis.*
Involucre 0. Sepals 5, spurred. Petals small, tubular .....4. Myosurus.

Tribe III. **RANUN'CULEÆ.** *Sepals* imbricate. *Achenes* with one ascending seed.....?.....5. Ranunculus.

Tribe IV. **HELLEB'OREÆ.** *Sepals* imbricate. *Follicles* many-seeded, except in *Actæa.*

* *Flowers regular. Follicles many-seeded.*

Sepals petaloid. Petals 0 ..... 6. Caltha.
Sepals petaloid, deciduous. Petals small, entire ..... 7. Trollius.
Sepals herbaceous, persistent. Petals small, 2-lipped ..... 8. Helleborus.
Sepals petaloid, deciduous. Petals small, 2-lipped ..... 8*. *Eranthis.*
Sepals 5–6, petaloid. Petals large, spurred ..... 9. Aquilegia.

** *Flowers irregular. Follicles many-seeded.*

Sepals many, the dorsal spurred ..... 9*. *Delphinium.*
Sepals many, the dorsal arched and hooded ..... 9**. *Aconitum.*

*** *Flowers nearly regular. Fruit a 1-seeded berry* ..... 10. Actæa.

1. CLEM'ATIS, *L.* TRAVELLER'S JOY.

Woody, usually climbing under-shrubs. *Leaves* opposite, usually compound, exstipulate; petioles often twining. *Inflorescence* axillary or terminal. *Sepals* usually 4, petaloid, valvate. *Petals* 0. *Stamens* many. *Carpels* many, each with 1 pendulous ovule. *Fruit* a head of sessile or stalked achenes, with long bearded styles.—DISTRIB. All temp. climates, rarer in the tropics; species 100.—ETYM. κληματίς, the Greek name for this or a plant of similar habit.

1. **C. Vital'ba,** *L.*; leaflets 3–5 remote. *Old Man's Beard.*

Hedges and thickets, most common on chalky soil; not a native of Scotland or Ireland (?); fl. July–Aug.—A climbing under-shrub. *Leaflets* 2–3 in. ovate-cordate, entire toothed or lobed; petioles persistent when twining. *Flowers* 1 in. diam., odorous, greenish-white. *Sepals* 4, pubescent. *Achenes* hairy; awns 1 in. feathery.—DISTRIB. Europe, from Holland southwards, N. Africa, W. Asia.

2. THALIC'TRUM, *L.* MEADOW-RUE.

Erect perennial herbs. *Leaves* compound, stipulate. *Flowers* panicled or racemed, often polygamous. *Sepals* 4–5, petaloid, imbricate. *Petals* 0. *Stamens* many. *Carpels* with 1 pendulous ovule. *Fruit* a small head of sessile or stalked achenes; style persistent or deciduous.—DISTRIB. Temp. and colder regions of the N. hemisphere; species 50.—ETYM. Probably the *Thalictrum* of Pliny.

1. **T. alpi'num,** *L.*; raceme simple, flowers few drooping, anthers linear apiculate.

Alpine and subalpine bogs; rare in Ireland; ascends to 4,000 ft.; fl. July–Aug. —*Stem* 4–10 in. wiry, simple, often stoloniferous. *Leaves* 2-ternate; leaflets ⅛ to ½ in., suborbicular, glaucous beneath, obtusely lobulate. *Raceme* drooping, then erect; pedicels recurved in fruit. *Sepals* 4, purplish. *Stamens* 8–20, pendulous. *Achenes* 2–3, stipitate, curved, ribbed.—DISTRIB. N. and Arctic Europe, N. and W. Asia to Himalaya, N. America.

2. **T. mi'nus,** *L.*; stem more or less striate, panicle lax, flowers drooping, anthers apiculate, fruit erect.

Dry places; ascends to 1,800 ft. in the Lake District; fl. July–Aug.—*Stem* ½–4 in. stout, rigid, often zigzag, striate throughout or towards the nodes only, usually furrowed when dry. *Leaves* triangular, 3–4-pinnate; leaflets variable, ¼–1 in.; lobes 3–6, acute or obtuse; stipules formed by the sheathing leaf-bases. *Sepals* 4, yellow-green. *Achenes* 3–6 ovoid, ascending,

sessile. — DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to the Himalaya, Greenland. Various forms have sometimes stipellæ to the leaflets.

Sub-sp. MI'NUS proper; often glaucous and glandular, stem 6–18 in., leafless at the base, auricles of stipules spreading, achenes gibbous 8-ribbed.—VAR. 1, *maril'imum;* branches of broad panicle spreading. Sandy seacoasts.—VAR. 2, *monta'num*, Wallroth (sp.); branches of deltoid panicle erecto-patent. *T. calca'reum*, Jord.

Sub-sp. MA'JUS, *Jacq.*; stem 3 ft. leafy at the base, leaflets large, auricles of stipules reflexed, achenes compressed gibbous 10-ribbed. *T. minus*, L. Herb., *T. flexuo'sum*, Bernh.—More common in Scotland.

Sub-sp. KOCH'II, *Fries* (sp.); stem 3–4 ft. leafy at the base, leaflets very small, auricles of stipules horizontal, achenes hardly compressed not gibbous. —Lake District, rare.

Sub-sp. SAXAT'ILE, *Schleich.* (sp.); stem 1–3 ft., leafy at the base, auricles of stipules reflexed, flowers suberect, achenes not gibbous.—Hills of Cambridge and Somerset.

3. **T. fla'vum,** *L.*; stem furrowed, panicle compound, flowers erect crowded at ends of branches, anthers not apiculate.

Wet places, from Fife and Argyle southwards, rare in Scotland; local in Ireland; fl. July–Aug.—*Rootstock* yellow, creeping, stoloniferous. *Stem* 2–4 ft., stout. *Leaves* 3-nately 2–3-pinnate; leaflets 1–1½ in., 3-lobed. *Panicle* subcorymbose or pyramidal; flowers pale yellow, often umbelled. *Sepals* small, 6–10. *Anthers* bright yellow. *Achenes* small, dark, 8-ribbed.—DISTRIB. Europe (Arctic), N. Africa, N. Asia.

VAR. 1, *sphærocar'pum*, Syme; panicle usually contracted, achenes broadly oblong.—VAR. 2, *ripa'rium*, Jordan (sp.); panicle usually lax, achenes oblong.—VAR. 3, *Moriso'nia*, Gmel. (sp.); panicle usually interrupted, fascicles of flowers small, achenes narrow oblong.

3. ANEMO'NE, *L.*

Perennial herbs. *Leaves* radical, lobed or divided: *Flowers* on 1- or more-flowered scapes, rarely yellow; involucre 3-partite. *Sepals* 4–20, petaloid, imbricate. *Petals* 0. *Stamens* many, outer sometimes deformed or petaloid. *Carpels* many; ovule 1, pendulous. *Fruit* a head of sessile achenes, with naked or bearded styles.—DISTRIB. Cold and temp. regions; species 70.—ETYM. ἄνεμος, *the wind*—of obscure application.—All parts very acrid.

1. **A. Pulsatil'la,** *L.*; calyx campanulate, sepals 6 silky, outer stamens reduced to glands, awns long feathery. *Pasque-flower.*

Chalk downs and limestone pastures; Yorkshire to Berks, and Oxfordshire to Suffolk; fl. May–June.—Silky, 4–10 in. *Rootstock* stout, woody. *Leaves* maturing after flowering, 3-pinnatifid; segments linear; involucre sessile, divided to the base into long linear segments. *Flower* 1½ in., solitary, inclined in bud, dull purple; peduncle lengthening after flowering. *Styles* of silky achenes 1½ in.—DISTRIB. Europe, N. Asia to Dahuria.

2. **A. nemoro'sa,** *L.*; sepals 6 (rarely 5–9) oblong glabrous spreading, stamens all perfect, achenes with a straight style. *Wood Anemone.*

Woods and copses; ascends to 2,800 ft. in the Highlands; fl. April–May.—Nearly glabrous, slender. *Rootstock* horizontal, woody. *Scape* 4–8 in. *Leaves* few, usually remote from the scape, petioled, 3-foliolate; leaflets

narrow, subsessile, cut lobed or pinnatifid, involucral like the radical, petioled. *Flower* solitary, 1–1½ in. diam. *Sepals* oblong, white, rarely purple. *Achenes* downy, as long as the style.—DISTRIB. Europe (Arctic), W. Siberia, N. America.

A. APENNI'NA, *L.*; leaves 2-nately pinnate, sepals 10–14 narrow pale blue, achenes pointed.

Naturalized in plantations, &c. in England, Scotland and Ireland; fl. April.—Glabrous. *Rootstock* stout, black. *Scape* 4–8 in. *Leaves* few, from the base of the scape; leaflets pinnatifid, subacute, involucral similar. *Flower* 1½ in. diam. *Sepals* spreading. *Head* of ovoid achenes globose.—DISTRIB. Italy to Turkey.

3*. *ADO'NIS, L.* PHEASANT'S-EYE.

Herbs, annual or perennial. *Leaves* much divided. *Sepals* 5–8, petaloid, imbricate. *Petals* 5–16, yellow or red, eglandular. *Carpels* many; ovule 1, pendulous. *Fruit*, a spike or head of many achenes. *Styles* short, persistent.—DISTRIB. Temp. Europe and Asia; species 3–4.—ETYM. classical.

A. AUTUMNA'LIS, *L.*; annual, flowers globose, petals broad concave.

Naturalized in Suffolk, and S. counties, sporadic elsewhere, and in Scotland and Ireland; an alien or colonist, *Watson;* fl. May–July.—*Stem* 8–10 in., erect, branched, very leafy. *Leaves* decompound, segments small, linear. *Sepals* greenish. *Petals* scarlet, with a dark basal spot, suberect, rather longer than the sepals. *Head* of reticulated achenes, sometimes elongate.—DISTRIB. Europe, W. Asia, N. Africa; introd. in America.

4. MYOSU'RUS, *L.* MOUSE-TAIL.

Small annual herbs. *Leaves* narrow, all radical. *Scapes* 1-flowered, leafless. *Sepals* 5, rarely 6–7, with a small basal spur behind, imbricate in bud. *Petals* 5, rarely 6–7, small, narrow, tubular, or 0. *Stamens* few. *Carpels* many; ovule 1, pendulous. *Fruit* a long spike of densely packed achenes; style short, persistent.—DISTRIB. Europe, S. America; species 2.—ETYM. μῦς and *οὐρά, mouse-tail.*

1. **M. min'imus,** *L.*; spike slender, style very short.

Cornfields, &c. from Northumberland southwards; fl. April–June.—Glabrous, 2–6 in. *Leaves* erect, many, linear, rather fleshy. *Scapes* many, slender. *Flowers* minute, yellow-green. *Sepals* 5, narrow-oblong; spur appressed to the scape. *Petals* 5; limb short, ligulate. *Spike* of achenes dense, lengthening to 1–3 in.; receptacle filiform; achenes attached by the ventral surface, minute, keeled, mucronate at the back.—DISTRIB. Europe, W. Asia, N. Africa; introd. in America, &c.

5. RANUN'CULUS, *L.* BUTTERCUP, CROWFOOT.

Annual or perennial herbs. *Leaves* entire, lobed or compound; stipules membranous or 0. *Flowers* usually panicled, white or yellow. *Sepals* 3–5, caducous, imbricate in bud. *Petals* usually 5, rarely 0, glandular at the base. *Stamens* many. *Carpels* many; style short; ovule 1, ascending. *Fruit* a head or spike of apiculate or beaked achenes.—DISTRIB. All temp. regions; species about 160.—ETYM. *rana, a frog.*

SECTION 1. **Batra'chium.**[1] Water-plants. *Leaves* often submerged and multifid; stipules membranous. *Peduncles* usually leaf-opposed, 1-flowered. *Petals* white; gland naked, yellow, basal. *Achenes* transversely wrinkled.

1. **R. aquat'ilis,** *L.*; floating leaves 0 or 3-lobed or -partite, submerged 2-3-chotomously multifid, segments capillary or linear, stipules broad, auricles free or 0, receptacle and sometimes the achenes more or less hispid, stigma oblong.

Ponds and ditches, ascends to 1,500 ft.; fl. May–Aug.—A very variable plant. —DISTRIB. All temp. regions, except New Zealand and the Pacific.

Sub-sp. HETEROPHYL'LUS, *Auct.* (sp.); floating leaves rarely 0, submerged suborbicular, segments not in one plane, stipules broad adnate usually auricled, petals large mostly 7–9-nerved, stamens many. Also N. America and Arctic Europe.

* *Segments of submerged leaves rather rigid, spreading when removed from the water.*—VAR. 1, *pelta'tus,* Fries (sp.); floating leaves reniform 3-lobed to the middle, peduncles long, receptacle spherical.—VAR. 2, *floribun'dus,* Bab. (sp.); floating leaves reniform 3-lobed to below the middle, peduncles about as long as the leaves, receptacle spherical. — VAR. 3, *confu'sus,* Godron (sp.); floating leaves 3-foliolate, peduncles slender longer than the leaves, receptacle ovoid.—VAR. 4, *Baudo'tii,* Godron (sp.); floating leaves 3-partite, segments cuneate, peduncles stout more slender upwards, receptacle ovoid. *R. aquatilis,* var. *Symei, Hook.* and *Arn.*

* * *Segments of submerged leaves collapsing, and forming a pencil when removed from the water.*—VAR. 5, *heterophyl'lus* proper, Fries (sp.); floating leaves rarely 0, orbicular 3-lobed to or below the middle, segments cuneate approximate, peduncles rather slender about as long as the leaves, receptacle conical.—VAR. 6, *pseudo-flu'itans,* Syme (sp.); floating leaves 0, or 3-lobed to or below the middle, segments of submerged very long, peduncles much longer than the leaves, receptacle spherical.

Sub-sp. PANTO'THRIX, *Boreri* (sp. in part); stem very slender, floating leaves 0, rarely 3-partite or -foliolate, submerged 2–3-chotomously multifid, segments not in one plane, stipules ½-adnate, auricles large, peduncles not tapering about as long as the leaves, petals 5–7-veined, stamens few, receptacle globose or oblong. Ponds and ditches; less common than *heterophyllus.*—VAR. 1, *Drouëtii,* Schultz (sp.); segments of submerged leaves collapsing when removed from the water, buds oblong or obovoid.—VAR. 2, *trichophyl'lus,* Chaix (sp.); segments of submerged leaves spreading when removed from the water, buds globose.

Sub-sp. CIRCI'NATUS, *Sibthorp* (sp.); floating leaves 0, submerged orbicular subsessile, segments rigid in one plane, stipules narrow altogether adnate not auricled, petals much larger than the calyx 7–9-veined, stamens many, receptacle oblong, style cylindric. *R. diva'ricatus,* Schrank.—A small and very distinct form, also N. American.

Sub-sp. FLU'ITANS, *Lamk.* (sp.); floating leaves 0 or 3-foliolate, submerged cuneate, segments very long (6–10 in.) sub-parallel linear rigid, stipules

[1] The species of this section are considered by some authors as forms of one or two, by others as 20 to 30. The comparative length of the stamens and carpels varies with age; and the shape of the achenes and styles varies with age and the position of the achenes on the receptacle; these characters are not valueless, but are almost undefinable. For the subspecies, &c., I have followed Syme; who has, however, in the 1869 Report of the Botanical Exchange Club, so far modified his views, as to reduce the first four to two.

½-adnate, auricles large rounded, petals much larger than the calyx sometimes 2-seriate, veins many, stamens many short, receptacle conical at length glabrous, style cylindric.—Common, a very large and distinct form.—VAR. *Bach'ii,* Wirtg. (sp.); leaves shorter almost sessile narrower.—Rare.

Sub-sp. TRIPARTI'TUS, *DC.* (sp.); floating leaves or all 3-lobed nearly to the base or 3-partite, segments cuneate, submerged 0 or with collapsing segments, peduncles slender shorter than the leaves, stipules free, receptacle pubescent, style slender deciduous.—Surrey, Pembroke, Cornwall, Ireland.

2. **R. Lenorman'di,** *Schultz;* leaves uniform floating or submerged alternate long-petioled orbicular-reniform, lobes or crenatures broad shallow narrowest at the base, stipules large broad ½-adnate, petals 5-veined twice as long as the calyx, receptacle glabrous, style usually terminal. *R. cæno'sus,* Gren. and Godr., not of Gussone.

Shallow ponds and ditches from Mid-Scotland south; south half of Ireland; ascends to 1,600 ft. in Yorkshire; fl. June–Aug.—*Stem* branched. *Leaves* very variable in size, rounded and more crenate than in *R. hederaceus. Flower* ½ in. diam.—DISTRIB. W. Europe.

3. **R. hedera'ceus,** *L.*; leaves uniform usually opposite broadly reniform 5-angled or -lobed, lobes usually entire broadest at the base, stipules adnate longer than broad, petals narrow 3-veined scarcely longer than the calyx, stamens few, receptacle glabrous, style lateral. *R. cænosus,* Gussone, not of Hook. and Arn. *Ivy-leaved Ranunculus.*

Shallow ponds and ditches; ascends to 2,200 ft. in Wales; fl. May–Aug.—Habit of *R. Lenormandi. Leaves* more or less angled as in the ivy, often with a semi-lunar black patch, lobes rarely notched. *Flowers* very small.—DISTRIB. Temp. and sub-Arctic Europe, S. Africa, Greenland.

SECTION 2. **Hecato'nia.** Perennial, rarely annual. *Leaves* mostly radical, stipules inconspicuous or 0. *Stems* 2- or more-flowered. *Sepals* 5. *Petals* 5, yellow. *Achenes* not tubercled (except in *R. ophioglossifolius*).

* *Leaves undivided; gland of petals with a small scale.*

4. **R. Lin'gua,** *L.*; perennial, erect, leaves lanceolate sessile ½-amplexicaul entire or toothed, achenes pitted, style broad. *Spear-wort.*

Marshes and ditches, from Moray south, local in Ireland; fl. July–Sept.—Glabrous. *Roots* densely fibrous. *Stem* 2–3 ft., hollow; lower nodes rooting. *Leaves* 6–10 in. ¾–1 in. broad, veins parallel and reticulated. *Flowers* 2 in. diam., handsome, sub-panicled.—DISTRIB. Temp. Europe, N. and W. Asia to the Himalaya.

5. **R. Flam'mula,** *L.*; perennial, procumbent or ascending, leaves petioled linear- or ovate-lanceolate nearly entire, achenes minutely pitted, style minute subulate. *Lesser Spear-wort.*

Wet places; ascends to 2,700 ft. in the Highlands; fl. June–Aug.—Very variable, glabrous or slightly hairy, 4–12 in. *Lowest leaves* petioled, ovate, upper more lanceolate and sessile. *Flower* yellow, rarely ¾-in. diam. *Head* of achenes small.—DISTRIB. Europe (Arctic), N. Asia, Africa, and America.

Sub-sp. FLAM'MULA proper; stem prostrate or erect, internodes straight, style of achenes short obtuse. A small form of this passing into the following is found (according to A. Gray) in the N. United States.

Sub-sp. REP'TANS, *L.* (sp.); stem creeping very slender, internodes

arching, style of minute achenes subcylindric, tip recurved. Sandy shores of Windermere and Loch Leven.

6. **R. ophioglos'sifolius,** *Villars;* annual, erect, many-flowered, lower leaves long-petioled broadly ovate or cordate, petals scarcely longer than the sepals, achenes minutely granulate small hairy, style minute.

St. Peter's Marsh, Jersey; fl. June–Aug.—Glabrous or slightly hairy upwards *Root* fibrous. *Stem* 6–10 in. or more, slender, decumbent at the base, branched, hollow, furrowed. *Peduncles* furrowed. *Flowers* ½ in. diam.—DISTRIB. W. and S. Europe.

** *Leaves divided, gland of petals without a scale.*

7. **R. auri'comus,** *L.*; perennial, leaves orbicular 3-lobed or -partite, segments of lower obtuse cuneate cut, of upper linear spreading subentire, sepals spreading pubescent, head of downy achenes globose. *Goldielocks.*

Woods and copses, from Lanark and Moray southwards; ascends to 1,600 ft. in the Highlands; rare in the S. and W. of Ireland; fl. April–May.—Erect, 6–10 in., branched, slender, glabrous or slightly hairy upwards. *Radical leaves* long-petioled. *Peduncles* not furrowed, pubescent. *Flowers* ¾ in. diam. *Petals* larger than the downy sepals, bright yellow, often imperfect (var. *depaupera'tus*). *Achenes* on tubercles of the receptacle, compressed; style slender, subulate, curved.—DISTRIB. Europe (Arctic), N. and W. Asia to the Himalaya.—Not acrid.

8. **R. scelera'tus,** *L.*; annual, erect, stem hollow, leaves glabrous 3-lobed or -partite, segments of lower lobed obtuse, of upper linear subentire, sepals reflexed hairy, head of small glabrous achenes oblong.

Ditches, &c., rarer in the N.; fl. May–Sept.—*Root* fibrous. *Stem* 8–24 in., subcorymbose above. *Leaves* variable in lobing, upper a little hairy. *Flowers* ½ in. diam. *Achenes* many, small, a little wrinkled on the faces, furrowed on the dorsal edge; style minute.—DISTRIB. Europe (Arctic), N. Asia, N. India to Bengal; introd. in America, &c.—Very acrid.

*** *Leaves divided, gland of petals with a small scale.*

9. **R. a'cris,** *L.*; perennial, hairy, erect, without runners, leaves 3–7-partite, segments of lower cuneate deeply cut and lobed, of upper linear entire, peduncles not furrowed, sepals spreading pubescent, receptacle glabrous, achenes glabrous compressed margined, style recurved.

Meadows, &c.; ascends to nearly 4,000 ft. in the Highlands; fl. April–Sept.—*Rootstock* straight. *Stem* 8 in.–3 ft. *Leaves* usually all petioled, orbicular or 5-angled in outline, uppermost sessile. *Flower* 1 in. diam. *Petals* spreading.—DISTRIB. Europe (Arctic), N. Asia; introd. in America.

Mr. Syme has pointed out (Report of Bot. Exchange Club for 1869, p. 8), that the varieties *Steve'ni,* Reich. (sp.), *vulga'tus,* Jord. (sp.), and *rec'tus*? Boreau (sp.), all enumerated in his English Botany (p. 38), are not the continental plants so called, but forms of *Borea'nus,* Jord. (sp.), and *tomophyl'lus,* Jord. (sp.).

10. **R. re'pens,** *L.*; perennial, hairy, stem decumbent below with long runners, leaves 3-foliolate or 3-nately pinnatisect, segments cuneate lobed and toothed, those of the upper leaves more entire narrower, peduncles

furrowed, sepals spreading hairy, receptacle slightly hairy, achenes compressed glabrous margined, style hooked.

Waste ground; ascends to 2,700 ft. in the Highlands; fl. May–Aug.—*Root-stock* stout, short. *Stem* 8 in.–2 ft. *Leaves* petioled, triangular or ovate; segments variable, middle usually longest. *Flowers* 1 in. diam. *Petals* generally sub-erect.—DISTRIB. Europe (Arctic), N. and W. Asia, N. Africa; introd. in America.

11. **R. bulbo'sus,** *L.*; perennial, hairy, erect, stem swollen at the base without runners, leaves 3-foliolate or ternatisect, segments lobed, peduncles furrowed, sepals reflexed and receptacle hairy, achenes compressed glabrous margined, style short hooked.

Meadows, &c.; ascends to 1,500 ft. in the Highlands; fl. May–June.—*Stem* 6–12 in., base often as big as a walnut, sometimes corymbose above. *Leaves* variable in form and lobing. *Flowers* ½–1 in. diam.—DISTRIB. Europe, Asia, N. Africa; introd. in America.

SECTION 3. **Echinel'la.** Annual, rarely biennial. *Roots* fibrous. *Leaves* radical and cauline, divided; stipules inconspicuous. *Sepals* 5. *Petals* 5, yellow. *Achenes* tubercled or spinose, compressed, margin thickened.

12. **R. hirsu'tus,** *Curtis;* erect, leaves 3-lobed or -partite, segments obtuse cut, peduncles furrowed, sepals reflexed hairy, petals with a scale over the gland, receptacle hairy, achenes tubercled towards the margin, style straight. *R. Philono'tis,* Ehrhart.

Waste damp ground from Argyle and Forfar southwards; rare in Scotland; absent in Ireland; fl. June–Oct.—Hairy. *Stems* many, 6–18 in. *Leaves* variable in lobing. *Flowers* about 1 in. diam., peduncles with spreading or reflexed hairs. *Achenes* broad, much flattened.—DISTRIB. Europe, W. Asia, N. Africa.

13. **R. arven'sis,** *L.*; erect, lowest leaves obovate or cuneate toothed, upper 3-partite or -foliolate, segments narrow cut, peduncles not furrowed, sepals spreading, petals with a scale over the gland, receptacle hairy, achenes usually covered with hooked spines, style stout hooked.

Cornfields, from the Forth and Clyde southwards, in Ireland near Dublin only; a colonist, *Watson;* fl. May–July.—Nearly glabrous. *Stem* 6–24 in., solitary. *Leaves* variable. *Flowers* ½ in. diam., pale. *Petals* suberect. *Achenes* few, large.—DISTRIB. Europe, temp. Asia to India, N. Africa.

14. **R. parviflo'rus,** *L.*; stems slender decumbent, leaves orbicular or reniform 3-lobed, segments toothed, peduncles leaf-opposed or in the forks, furrowed, sepals reflexed, petals 3–5 small oblong, gland with an obscure scale, receptacle glabrous, achenes faced with hooked tubercles, style short nearly straight.

Dry banks, &c. from Durham southwards; S. and E. of Ireland, rare; fl. May–Aug.—Hairy. *Stems* and branches spreading, 6–18 in. *Leaves* divided to the middle or less, lowest often entire, uppermost more deeply cut into linear lobes. *Flowers* ¼–½ in. diam. *Achenes* small.—DISTRIB. Europe from Denmark southwards, W. Asia, N. Africa; introd. in America.

SECTION 4. **Fica'ria,** *Dillen.* (gen.). Perennial. *Leaves* chiefly radical,

entire, not beaked. *Sepals* 3–5. *Petals* 8–12, yellow; gland with a scale, *Achenes* small.

15. **R. Fica'ria,** *L.*; leaves cordate obtusely angled or crenate. *Pilewort or Lesser Celandine.*

Pastures and waste places; ascends to 2,400 ft. in Wales; fl. March–May.—Glabrous. *Root* of stout cylindric tubers. *Stem* short, decumbent, branched at the base. *Leaves* variable, on stout petioles with dilated stipular bases. *Peduncles* stout, axillary, 1-flowered. *Flowers* about 1 in. diam., bright yellow. Head of large subgloboso smooth *achenes* globular; style minute.—DISTRIB. Europe (Arctic), W. Asia, and N. Africa.

VAR. 1, *diver'gens,* F. Schultz; lobes of lowest leaves not overlapping at the base, lowest sheaths narrow.—VAR. 2, *incum'bens,* F. Schultz; lobes of lowest leaves overlapping at the base, lowest sheaths amplexicaul.

6. CAL'THA, *L.* MARSH MARIGOLD.

Herbs with stout creeping rootstocks. *Leaves* chiefly radical, cordate. *Flowers* terminal, few, white or yellow. *Sepals* 5 or more, petaloid, deciduous, imbricate. *Petals* 0. *Carpels* several, sessile; ovules numerous, in two series. *Follicles* numerous, many-seeded. *Seeds* with a prominent raphe and thickened funicle.—DISTRIB. N. and S. temp. and cold regions; species 5–6.—ETYM. *κάλαθος, a cup.*

1. **C. palus'tris,** *L.*; leaves orbicular reniform or deltoid toothed.

Marshes and ditch-banks; ascends to 3,400 ft. in the Highlands; fl. March–May.—A coarse, glabrous, dark green, showy, very variable plant.—*Root-stock* short, horizontal. *Stem* 8 in.–3ft., suberect, prostrate, or procumbent and rooting from all the nodes. *Stipules* very large, membranous glairy, quite entire in bud and enclosing the young leaf, as in *Magnoliaceæ* (Dickson). *Flowers* 1–2 in. diam., bright golden yellow. *Sepals* unequal, obovate or oblong. *Follicles* ½–¾ in.—DISTRIB. Europe (Arctic), N. and W. Asia to the Himalaya, N. America.

Sub-sp. PALUS'TRIS proper; nodes not rooting, radical leaves orbicular-reniform deeply 2-lobed at the base crenate-toothed, sinus narrow.—VAR. 1, *vulga'ris,* Schott (sp.); stem ascending many-flowered, flowers 1½–2 in. diam., sepals contiguous, follicles spreading, beak short.—VAR. 2, *Guerange'rii,* Boreau (sp.); stem ascending, flowers many smaller, sepals remote when expanded, follicles spreading, beak longer. Probably *C. ripa'ria,* Don, and the origin of the double-flowered *Caltha* of the garden.—VAR. 3, *mi'nor,* Syme; stem procumbent, flower solitary ¾–1 in. diam., sepals remote, follicles erect, beak short. Mountainous places.

Sub-sp. RAD'ICANS, *Forster* (sp.); rooting at the nodes, radical leaves deltoid obscurely 5-angled truncate or reniform at the base, toothed, teeth triangular. Forfarshire, *Don* (known now in cultivation only).

7. TROL'LIUS, *L.* GLOBE-FLOWER.

Erect perennial herbs. *Leaves* alternate, palmately lobed or cut. *Flowers* terminal, large, yellow or lilac. *Sepals* 5–15, petaloid, imbricate. *Petals* 5–15, small, narrow, claw very short, blade with a glandular pit at the base. *Stamens* very many. *Carpels* 5 or more, sessile; ovules many, 2-seriate. *Follicles,* 5 or more. *Seeds* angled, testa coriaceous.—

DISTRIB. N. temp. and arctic regions; species 9.—ETYM. *Trol, a globe,* in old German.

1. **T. europæ'us,** *L.*; flower globose, petals equalling the stamens.

Moist subalpine pastures and copses, from Worcester and S. Wales northwards, ascending to 3,300 ft.; N. of Ireland only, and very rare; fl. June–Aug. —Glabrous. *Rootstock* short, crowned with rigid fibres. *Stem* 6–24 in., simple, leafy. *Radical leaves* petioled, suborbicular, 5-partite, segments cuneate lobed and cleft; cauline smaller, sessile. *Flowers* 1–1½ in. diam., pale yellow. *Sepals* orbicular, concave. *Petals* oblong. *Stamens* short. *Follicles* transversely wrinkled, keeled, beaked. *Seeds* many, testa black dotted. —DISTRIB. Europe (Arctic) to the Caucasus.

8. HELLEB'ORUS, *L.* HELLEBORE, BEAR'S-FOOT.

Coarse perennial herbs. *Leaves* palmately pedately or digitately lobed, upper bract-like. *Flowers* corymbose. *Sepals* 5, large, petaloid or herbaceous, imbricate, persistent. *Petals* small, tubular, 2-lipped. *Stamens* many. *Carpels* free, or united below; ovules many, 2-seriate. *Follicles* few or many, dehiscing at the top. *Seeds* many, oblong, funicle thickened, testa crustaceous, shining.—DISTRIB. Europe, N. and W. Asia; species 10.—ETYM. *ἑλεῖν to injure,* and *βορά food.*

1. **H. vi'ridis,** *L.*; stem few-flowered annual, radical leaves digitate, cauline sessile, sepals spreading.

Woods, hedges, &c. chiefly on chalk in the S. and E. of England, often naturalized; a denizen, *Watson;* fl. March–April.—Glabrous, dark-green, 1–1½ ft. *Radical leaves* fully developed after flowering; leaflets 5–7, narrow, serrate, lateral cleft. *Flowers* inclined, 1½–2 in. diam. *Sepals* green, oblong. *Petals* 9–12, minute, shorter than the stamens, curved. *Follicles* 3; style straight, subulate.—DISTRIB. Europe, from Holland southwards, exclusive of Russia; introd. in U. States. Occasionally used as a substitute for *H. officinalis.*

2. **H. fœ'tidus,** *L.*; stem many-flowered perennial, leaves pedate, sepals erect. *Stinking Hellebore.*

Chalk-pastures and thickets S. and E. of England, rare, naturalized elsewhere, but indigenous in Suffolk; a denizen, *Watson;* fl. Feb.–March.—Glabrous below, glandular-pubescent above. *Stem* 1–2 ft. leafless, scarred below. *Lower leaves* petioled, leaflets 5–7, nearly as in *H. viridis,* but the outer segments recurved, upper with large sheaths. *Flowers* drooping, 1 in. diam. *Sepals* green, bordered with dull-purple, truncate. *Petals* shorter than the stamens. *Follicles* 3, wrinkled, glandular, style subulate.—DISTRIB. W. Europe, from Belgium southwards.—Plant fœtid and cathartic.

8*. *ERAN'THIS, Salisbury.* WINTER ACONITE.

Low herbs. *Rootstock* stout, creeping. *Radical leaves* palmate; cauline whorled and involuciriform. *Flower* solitary, yellow. *Sepals* 5–8, narrow, petaloid, deciduous, imbricate. *Petals* small, clawed, 2-lipped. *Stamens* many. *Carpels* 5–6 stipitate. *Follicles* many-seeded. *Seeds* ovoid or globose, testa smooth crustaceous.—DISTRIB. Europe and N. Asia; species 2.—ETYM. *ἔρος spring,* and *ἄνθος flower.*

E. HYEMA'LIS, *Salisb.*; sepals 6–8 oblong.

In plantations, parks, &c., naturalized; fl. Jan.–March.—*Stem* 4–6 in. *Radical*

leaves orbicular, 3–5-partite, segments obtusely lobed; petiole long. *Involucre* of 2 sessile lobed bracts. *Flower* cup-shaped, 1–1½ in. diam. *Sepals* pale yellow. *Petals* shorter than the stamens. *Follicles* as in *Helleborus*, but free and stipitate.—DISTRIB. W. Europe, from Belgium southwards.

9. AQUILE'GIA, *L.* COLUMBINE.

Erect herbs. *Rootstock* perennial. *Leaves* 3-nately divided. *Flowers* panicled or solitary, handsome. *Sepals* 5, regular, petaloid. *Petals* 5, concave, spurred behind. *Stamens* many, inner imperfect. *Carpels* 5, many-ovuled. *Follicles* 5. *Seeds* many, testa crustaceous smooth or granulated. —DISTRIB. N. temp. zone; species 5–6.—ETYM. *aquila*, from the form of the petals.

1. **A. vulga'ris,** *L.*; spur hooked, follicles cylindric hairy.

Woods and thickets, but often naturalized, ascending to 1,000 ft. in Yorkshire; N., E., and W. Ireland; fl. May–July.—*Rootstock* stout, blackish. *Stem* 1–2 ft., slender. *Radical leaves* fascicled, petioles long, 2–3-ternately divided, segments stalked, lobed, glaucous, glabrous, or pilose beneath. *Flowers* 1½–2 in. diam., loosely corymbose, drooping, blue or dull purple, (white or red in garden varieties). *Sepals* ovate-lanceolate. *Petals* oblong, spur curved, involute at the tip. *Inner stamens* reduced to broad wrinkled white filaments. — DISTRIB. Europe, Canaries, Siberia, Asia to the W. Himalaya.

9*. *DELPHIN'IUM, L.* LARKSPUR.

Erect, annual or perennial herbs. *Leaves* alternate, lobed or cut. *Flowers* racemed or panicled. *Sepals* 5, cohering below, dorsal spurred behind. *Petals* 2–4, small, spurs of the 2 dorsal developed within that of the sepal, 2 lateral spurless or 0. *Stamens* many. *Follicles* 1–5. *Seeds* many, testa coriaceous wrinkled or plaited.—DISTRIB. N. temp. zone; species about 40.—ETYM. δελφίν, from the form of the flower.

1. D. AJA'CIS, *Reich.* (not *L.*); racemes long, lower bracts lobed, follicles solitary pubescent. *D. Consol'ida*, Brit. Fl. (not L.).

Cornfields, naturalized in Cambridgeshire, sporadic elsewhere; alien or colonist, *Watson;* fl. June–July.—Annual, pubescent. *Stem* 10–18 in., slender, sparingly branched. *Leaves* cut into many narrow linear lobes, lower petioled, upper sessile. *Flower* 1 in. diam., blue, white or pink. *Sepals* spatbulate-oblong, spur ⅛ in. *Petals* 2. *Follicle* ¾ in., cylindric; style short. *Seeds* continuously plaited all round.—DISTRIB. Central and S. Europe, N. Africa; introd. in U. States.—Syme observes that *D. Aja'cis*, Reich. (and continental authors), is not the plant of Linnæus (which is *orienta'le* of Gay); hence the present plant should have a new name: but as the names *Consol'ida, orienta'lis*, and *Aja'cis* are now fixed, it is unwise to disturb the present arrangement. *D. Consol'ida*, L., has been once found in cornfields in Jersey; it has glabrous follicles shorter than those of *D. Aja'cis*, short racemes and seeds with interrupted ridges.

9**. *ACONI'TUM, L.* MONKSHOOD, WOLFSBANE.

Erect perennial herbs. *Leaves* alternate, palmately-lobed or cut. *Flowers* panicled or racemed. *Sepals* 5, dorsal large, arched, hooded; anterior narrowest. *Petals* 2–5, small; 2 upper with long claws, hooded at the tip, covered by the sepaline hood; 3 lower small or 0. *Carpels* 3–5,

many-ovuled. *Follicles* 3–5. *Seeds* many, testa spongy rugose.—DISTRIB. Mountains of the N. hemisphere.—ETYM. classical.

A. NAPEL'LUS, *L.*; leaf-lobes pinnatifid, raceme simple dense-flowered. Shady places near streams, native (?) in Wales, Hereford and Somerset, naturalized elsewhere; a denizen? *Watson;* fl. July–Sept.—*Rootstock* fusiform, black. *Stem* 1–2 ft., erect, slightly pubescent. *Leaves* palmately 5–7-partite; petiole dilated at the base; upper often sessile. *Flowers* bracteate and bracteolate, 1–1½ in. diam. dark blue, horizontal; pedicels erect, pubescent. *Upper sepal* at first concealing the others, then thrown back. *Spurs* of upper petals conical, deflexed. *Filaments* dilated below. *Anthers* greenish-black. *Follicles* 3–5, sub-cylindric, beaked.—DISTRIB. Europe, Siberia, W. Asia to the Himalaya.—A deadly acrid poison.

10. ACTÆ'A, *L.* BANE-BERRY, HERB CHRISTOPHER.

Erect perennial herbs. *Leaves* alternate, 3-nately compound; stipules adnate. *Flowers* small, in short crowded racemes. *Sepals* 3–5, rather unequal, petaloid. *Petals* 4–10, small, spathulate, or 0. *Carpel* 1, many-ovuled; stigma sessile, dilated. *Berry* many-seeded. *Seeds* depressed, testa crustaceous smooth.—DISTRIB. Colder regions of the N. hemisphere; species 1 or 3.—ETYM. ἀκτή, the *Elder*, from a fancied resemblance.

1. **A. spica'ta,** *L.*; raceme simple, fruiting pedicels slender. Copses on limestone, Yorkshire, Lake District, ascending to 1,000 ft.; native? *Watson;* fl. May.—*Rootstock* stout, black. *Stem* 1–2 ft., perennial, simple or sparingly branched. *Radical leaves* on long petioles, 2–3-ternately-pinnate; leaflets 1–3 in., ovate, acuminate, lobed and serrate, dark green, glabrous; stipules adnate, auricles short rounded. *Racemes* 1–2 in., solitary or few, oblong; peduncle pubescent. *Flowers* ¼ in. diam., white; pedicels pubescent, spreading in fruit. *Sepals* obtuse, caducous. *Petals* minute or 0. *Filaments* dilated above. *Berry* ½ in. long, ovoid, nearly black.—DISTRIB. Temp. and Arctic Europe, Asia, and N. America (a red-berried var.).—Nauseous, poisonous.

ORDER II. BERBERID'EÆ.

Herbs or shrubs, erect or climbing; buds scaly. *Leaves* alternate, simple or compound, usually exstipulate. *Inflorescence* various; flowers often globose. *Sepals* petaloid. *Petals* hypogynous, numerous, distinct, multiples of 2, 3 or 4, never of 5, imbricate or the outer valvate. *Stamens* one opposite each petal; anthers opening by 2 ascending lids or valves. *Carpel* 1, 1-celled; stigma usually peltate; ovules 2 or more, basal or on the ventral suture, anatropous, raphe ventral. *Fruit* a berry or capsule. *Seeds* albuminous; embryo various.—DISTRIB. Most cool regions, except Australia and S. Africa; genera 20, species 100.—AFFINITIES. See *Ranunculaceæ;* allied to *Menispermaceæ;* analogy in anther with *Laurineæ* and in the 3-nary floral whorls with Monocotyledons.—PROPERTIES. Astringent, and yield a yellow dye. Berries of *Berberis* acid and eatable.

1. BER'BERIS, *L.* BARBERRY.

Spiny shrubs, wood yellow. *Leaves* spinous-toothed, jointed on the very short petiole, often reduced to 3–7-fid spines. *Flowers* racemed,

solitary or fascicled, yellow, globose. *Sepals* 8–9, outer minute, imbricate. *Petals* 6, in 2 series, 2-glandular at the base, imbricate. *Stamens* 6, free. *Ovules* few, basal, erect. *Berry* 1–2-seeded. *Seed* oblong, testa crustaceous, albumen fleshy; embryo straight.—DISTRIB. N. temp. regions, sub-trop. Asia, temp. S. America; species 50.—ETYM. Arabic.

1. **B. vulga'ris,** *L.*; leaves obovate spinous-serrate.

Copses and hedges, not uncommon in England, naturalized in Scotland and Ireland; fl. May–June.—An acid shrub, 4–6 ft. *Leaves* on the woody shoots reduced to 3–7-forked (rarely simple) spines jointed on to a very short sheath, and bearing fascicles of leaves (reduced branches) in their axils; leaves on the annual shoots 1–1½ in., alternate, shortly petioled. *Flowers* ¼–½ in. diam., in terminal pendulous racemes, pale yellow; bracts short, triangular. *Stigma* broad, sessile, black. *Berry* ½ in. long, oblong, compressed, slightly curved, orange-red.—DISTRIB. Europe, temp. Asia, N. Africa; introd. in U. States.

ORDER III. NYMPHÆA'CEÆ.

Aquatic perennial herbs. *Leaves* usually floating often peltate, involute in vernation. *Scapes* 1-flowered, naked. *Floral whorls* all free and hypogynous, or adnate to a fleshy disk that envelops the carpels. *Sepals* 3–5. *Petals* 3–5 or many. *Stamens* many. *Carpels* 3 or more in one whorl, free, or adnate with the disk into a many-celled ovary; styles as many as carpels, stigma peltate or decurrent; ovules few or many, scattered over the walls of the cells, anatropous or orthotropous. *Fruit* a berry, its carpels consolidated, or separate and indehiscent. *Seeds* naked or arillate, albumen floury or 0; embryo enclosed in the enlarged amniotic sac.—DISTRIB. Temp. and trop.; genera 8; species 30–40.—AFFINITIES. With *Papaveraceæ*, but not close; presents analogies with *Hydrocharidcæ* and *Villarsia*.—PROPERTIES unimportant.

1. **NU'PHAR,** *Smith.* YELLOW WATER-LILY, BRANDY-BOTTLE.

Flowers yellow, globose. *Sepals* 5–6, concave. *Petals* many, small, hypogynous. *Stamens* many, inserted beneath the disk; filaments short flattened. *Carpels* many, together forming a many-celled ovary; stigma peltate, rayed; ovules many. *Berry* ovoid, of separable carpels. *Seeds* small.—DISTRIB. N. temp. hemisphere; species 3–4.—ETYM. Arabic *naufar*.

1. **N. lu'teum,** *L.*; leaves rotundate, base deeply 2-lobed, lobes usually contiguous, anthers linear, margin of stigma entire or waved 10–20-rayed.

Still waters from the Caledonian Canal south; ascends to near 1,000 ft. in Yorkshire; fl. June–Aug.—*Rootstock* creeping in mud; bud terminal. *Submerged leaves* membranous, waved; floating coriaceous; petioles obtusely 3-gonous at the top. *Flower* yellow, fragrant, odour alcoholic. *Sepals* concave. *Petals* 18–20, obovate-cuneate, thickly coriaceous, with a subterminal glandular pore. *Berry* ovoid, rostrate.—DISTRIB. Europe (Arctic), temp. Asia, N. America.—Rootstock abounds in tannic acid.

VAR. 1, *ma'jus*, Syme; flower 2–3 in. diam., stigma generally entire 15–20 rayed.—VAR. 2, *mi'nus*, Syme; flower 1½ in. diam., stigma waved at the margin 10–14-rayed.—Chartner's Lough, Northumb.

2. **N. pu'milum,** *Smith;* leaves oblong deeply 2-lobed at the base, lobes at length spreading, anthers oblong, stigma lobed at the margin, rays 8–10 reaching the margin.

Small lakes in Scotland, and Ellesmere in England, rare; fl. June–Aug.—Very similar to *N. luteum*, var. *minus*, differing in the smaller more orbicular petals, shorter anthers, and in the stigma. Petiole 2-edged.—DISTRIB. N. and Central Europe, N. Asia.

2. NYMPHÆ'A, *L.* WHITE WATER-LILY.

Habit of *Nuphar*, but flowers expanded, white blue or red, and fruit ripening under water. *Sepals* 4, adnate to the base of the disk. *Petals* in many series, inner successively transformed into stamens, both adnate to the disk. *Carpels* many, in 1 series, sunk in the fleshy disk, and with it forming a many-celled ovary, crowned by the connate radiating styles; ovules many, anatropous. *Fruit* a spongy berry. *Seeds* buried in pulp, all but enclosed in a sac-like fleshy aril.—DISTRIB. Most temp. and trop. regions, except N. Zealand and the Pacific Isles; species 20.—ETYM. dedicated by the Greeks to the nymphs.

1. **N. al'ba,** *L.*; leaves orbicular base cordate quite entire horizontal.

Lakes and ponds, ascending to 1,000 ft. in the Lake District; fl. June–Aug.—*Rootstock* stout, fleshy; buds terminal. *Leaves* 5–10 in. diam. floating, deeply 2-lobed at the base; lobes contiguous; petioles very long. *Flowers* concave. *Sepals* linear-oblong, white, green at the back. *Petals* oblong, obtuse, white, with no glandular pore. *Outer stamens* with petaloid filaments. *Fruit* globose; stigmatic rays 15–20.—DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to the Himalaya, N.W. America.

ORDER IV. PAPAVERA'CEÆ.

Annual or perennial herbs; juice milky or coloured. *Leaves* radical or alternate, exstipulate. *Flowers* usually nodding in bud, envelopes and stamens very caducous. *Sepals* 2, concave. *Petals* 4, crumpled. *Stamens* very many, hypogynous, filaments slender; anthers erect, insertion basal, bursting laterally. *Ovary* 1-celled, or 2–4-celled by prolonged placentas; style short or 0, stigmas radiating connate opposite the placentas, or separate and alternating with these; ovules in many rows on parietal placentas, anatropous, micropyle below, raphe lateral. *Capsule* dehiscing by pores or valves. *Seeds* many, small, albumen oily and fleshy; embryo minute, 2-fid.—DISTRIB. N. temp. zone chiefly; genera 17; species 65.—AFFINITIES. With *Fumariaceæ*, *Berberideæ*, *Ranunculaceæ*, and *Cruciferæ*.—PROPERTIES. Narcotic, emetic, purgative or acridly poisonous.

* *Capsule dehiscing by pores or very small valves.*

Stigmas 4 or more subsessile, forming a radiating disk.....1. Papaver.
Stigmas 4–5, deflexed on a conical elavate style .....2. Meconopsis.

** *Capsule dehiscing to, or nearly to, the base by valves.*

Ovary 1-celled. Seeds crested. Flower yellow .....3. Chelidonium.

Ovary more or less completely 2-celled. Flower yellow.....4. Glaucium.
Ovary 1-celled. Seeds not crested. Flower violet.....5. Rœmeria.

1. PAPA'VER, *L.* POPPY.

Annual herbs; juice milky. *Leaves* lobed or cut. *Flowers* on long peduncles. *Ovary* 1-celled; style short or 0, stigma discoid or pyramidal with radiating lobes opposite the placentas which project into the cell. *Capsule* short, opening by very small valves under the lobes of the persistent stigma. *Seeds* small, pitted.—DISTRIB. Europe, N. Africa and N. Asia, with one S. African and one Australian; species 12. Flowers sometimes 3-merous, and the placentas hardly projecting.—ETYM. obscure.

1. **P. hyb'ridum,** *L.*; leaves 2-3-pinnatifid sparingly hispid, filaments dilated upwards, capsule globose sessile bristly, stigma convex, rays 4–8.

Dry fields and waste places from Durham and Carnarvon southwards; rare in Ireland; a colonist, *Watson;* fl. May–July.—*Stem* 10–18 in., sparingly branched. *Leaves* with acute or awned lobes. *Flower* 1–2 in. diam. scarlet, with a black disk. *Capsule* ½ in. *Stigmatic rays* reaching or exceeding the edge of the disk.—DISTRIB. Europe, N. Africa, W. Asia to the Himalaya.

2. **P. Argemo'ne,** *L.*; leaves 2-pinnatifid, filaments dilated upwards, capsule clavate usually hispid, stigma convex, rays 4–6.

Waste dry places; rare in Ireland; a colonist, *Watson;* fl. May–July.—Habit. &c. of *P. hybridum*, but weaker, flowers smaller and paler, petals narrower, and capsule very different. The smallest British species.—DISTRIB. Europe, N. Africa, W. Asia, introd. in America.

3. **P. du'bium,** *L.*; leaves 1-2-pinnatifid, filaments filiform, capsule sessile obovoid glabrous, stigma 6–12-rayed.

Waste places; a colonist, *Watson;* fl. May–July.—Habit of succeeding species. Hairs of peduncle appressed. Pairs of petals unequal.—DISTRIB. Europe, N. Asia, N. W. India; introd. in America.

Sub-sp. LAMOT'TEI, Boreau (sp.); leaf-lobes shorter, capsule narrowing from just below the stigma to the base, lobes of stigmatic disk spreading. Abundant.

Sub-sp. LECOQ'II, Lamotte (sp.); leaf-lobes longer, capsule broadest at ⅓ below the stigma, lobes of stigmatic disk defloxed. England and Ireland, rare.

4. **P. Rhœ'as,** *L.*; leaves 1-2-pinnatifid, filaments filiform, capsule subglobose glabrous, stigma convex with overlapping lobes, rays 8–12.

Cornfields and waste places; rare N. of the Tay; a colonist, *Watson;* fl. June–Aug. *Stem* branched, hispid. *Leaf* lobes ascending, with a bristle at the tip. *Peduncles* with spreading or appressed hairs. *Flowers* 3–4 in. diam. scarlet; pairs of petals unequal. *Capsule* stipitate.—DISTRIB. Europe, N. Africa, W. Asia to India.

P. SOMNI'FERUM, *L.*; glaucous, glabrous or setigerous, leaves amplexicaul sinuate-lobed or toothed, flowers large white or blue-purple, filaments slightly dilated upwards, capsule ovoid or globose stipitate. *Opium Poppy.*

Cornfields and waste places, sporadic. Established in Kent, *Syme;* fl. July–Aug.—This has no claim to be called English. It varies in the shape of the capsule, colour of the flower, and has black or white seeds.—DISTRIB. Europe, W. Africa, all Asia; introd. in N. America.

2. MECONOP'SIS, *Viguier.* WELSH POPPY.

Perennial herbs; juice yellow. *Leaves* entire pinnate or pinnatifidly lobed. *Flowers* solitary or racemed. *Ovary* 1-celled; style distinct, stigma dilated or club-shaped radiating; placentas 4 or more projecting parietal. *Capsule* ovoid or elongate, with short valves below the persistent style. *Seeds* small, testa rugose.—DISTRIB. Mountainous regions of the N. hemisphere; species 9.—ETYM. *μήκων a poppy,* and *ὄψις resemblance.*

1. **M. cam'brica,** *Vig.*; leaves pinnate, lobes pinnatifid.

Moist glens in Devon, Somerset, York, Westmoreland, and Wales, ascending about 2,000 ft., and Ireland; naturalized in Scotland; fl. June.—Nearly glabrous. *Rootstock* stout, branched, tufted; roots thick. *Stem* 1–2 ft., woolly at the base. *Leaves* petioled, pale green, segments distinct or decurrent, ovate-lanceolate, lobed and toothed. *Flowers* 2–3 in. diam., pale yellow; peduncles long. *Sepals* hairy. *Petals* orbicular. *Style* short; stigma capitate, 4–6-rayed. *Capsule* 4–6-valved, ribbed.—DISTRIB. W. Europe, from Ireland to the Pyrenees.

3. CHELIDO'NIUM, *L.* CELANDINE.

Erect, branched perennial herbs; juice yellow. *Leaves* much divided. *Flowers* yellow. *Ovary* 1-celled; style dilated at the top, stigmas 2 adnate reflexed; placentas 2, slender, parietal. *Capsule* linear; valves thin, separating upwards from the persistent placentas and style. *Seeds* with a shining testa and crested raphe.—DISTRIB. Europe and Japan; species 2. —ETYM. doubtful.

1. **C. ma'jus,** *L.*; leaves 1–2-pinnate, flowers small.

Waste places, hedgerows, in the S. of England, elsewhere an obvious escape, probably naturalized only; a denizen, *Watson;* fl. May–Aug.—*Stem* 1–2 ft., brittle, sparingly hairy, leafy. *Leaves* membranous, glabrous beneath; segments 1–2 in., ovate, toothed and lobed; petiole dilated at the base. *Flowers* ¾–1 in. diam., in loose few-flowered umbels, yellow; pedicels slender; bracts whorled. *Capsule* 1½ in., readily dehiscing, valves torulose.—A variety occurs in cultivation with laciniate petals.—DISTRIB. Europe (Arctic), Siberia, W. Asia to Persia; introd. in N. America.

4. GLAU'CIUM, *Juss.* HORNED POPPY.

Glaucous herbs; juice yellow. *Leaves* lobed or cut. *Flowers* large, yellow or purple; peduncles long. *Ovary* 2-celled; style short or 0; stigmatic lobes 2, deflexed, opposite the placentas. *Ovules* very many; placentas 2, narrow, meeting in the axis of the ovary. *Capsule* long, narrow, 2-valved almost to the base. *Seeds* many, sunk in the spongy septum, testa pitted.—DISTRIB. Chiefly Mediterranean; species 5–6. The false dissepiment of the ovary (formed by the placentas as in *Cruciferæ*) is sometimes incomplete, and 3 placentas occasionally occur.—ETYM. *γλαύκιον, blue,* from the hue of the plants.

1. **G. lu'teum,** *L.*; leaves ½-amplexicaul, capsule tubercled.

Sandy sea-shores from the Forth and Clyde southwards, and all round Ireland; fl. June–Oct.—Glaucous, sub-hispid, annual, sometimes perennial. *Stem* 1–2 ft., branched, erect or ascending. *Radical leaves* 2-pinnatifid, rough with stout hairs; lobes pointing various ways. *Flowers* 2–4 in. diam., golden yellow; peduncles short, glabrous. *Petals* in opposite dissimilar

pairs. *Pod* curved, a foot long, glabrous; stigmatic lobes spreading. —DISTRIB. Europe, N. Africa, W. Asia; introd. in U. States.

5. RŒME'RIA, *DC.*

Annual herbs; juice yellow. *Leaves* much cut. *Flowers* long-peduncled, violet. *Sepals* 2. *Petals* 4. *Ovary* 1-celled; stigma sessile, lobes 2–4, deflexed, opposite as many slender placentas; ovules many. *Capsule* linear, 2–4-valved nearly to the base. *Seeds* many, testa rough.—DISTRIB. Cornfield plants of Europe and W. Asia; species 2.—ETYM. *J. F. Rœmer*, a German botanist.

1. **R. hyb'rida,** *DC.*; leaves 3-pinnatifid, capsule 3-valved. *Glau'cium viola'ceum*, Juss.

Dry soil, Swaffham Prior, Cambs and Norfolk; a colonist, *Watson;* fl. May–June.—Habit of *Papaver Argemone*, glabrous or slightly hairy. *Stem* erect. *Leaves* 1- or 2-pinnatifid, segments tipped by a bristle. *Flower* 2–3 in. diam., violet-purple with a black disk. *Sepals* hairy. *Capsule* 2–3 in., cylindric., hispid above.—DISTRIB. Central and S. Europe.

ORDER V. FUMARIA'CEÆ.

Annual or perennial herbs; juice watery. *Leaves* usually divided. *Flowers* racemose. *Sepals* 2, small, scale-like, deciduous. *Petals* 4, in 2 usually very dissimilar pairs; 2 outer larger, one or both gibbous or spurred; two inner smaller, erect, often coherent at the tips. *Stamens* (in the British species) 6, in 2 bundles opposite the 2 outer petals; anther of central stamen in each bundle 2-celled, of lateral 1-celled. *Ovary* 1-celled; style long or short, stigma obtuse or lobed; ovules two or more, amphitropous; placentas parietal. *Fruit* a 2-valved many-seeded capsule, or an indehiscent 1-seeded nut. *Seeds* albuminous, raphe sometimes appendaged; embryo minute.—DISTRIB. Natives of the temp. and warm N. hemisphere, and S. Africa; genera 7; species 100.—AFFINITIES. Close with *Papaveraceæ*, near *Cruciferæ* in the structure of the fruit of several.—PROPERTIES. Astringent, acrid, and reputed diaphoretic.

1. FUMA'RIA, *L.* FUMITORY.

Annual, rarely perennial herbs; usually branched, often climbing. *Leaves* much divided; segments very narrow. *Flowers* small, in terminal or leaf-opposed racemes. *Petals* 4, erect, conniving; 2 outer dissimilar, one gibbous or spurred at the base, the other flat; 2 inner narrow, cohering by their tips, winged or keeled at the back. *Stamens* 6, in 2 bundles opposite the outer petals: one filament usually spurred. *Ovary* 1-celled; style filiform, stigma entire or shortly lobed; ovules 2, on 2 placentas. *Fruit* 1-seeded, indehiscent, globose.—DISTRIB. Europe, Asia, following cultivation; species 6.—ETYM. doubtful.—The following species are by many considered as varieties of one.

1. **F. capreola'ta,** *L.*; climbing by the twisting petioles, leaf-segments flat, sepals ovate toothed below at least as broad and $\frac{1}{3}$–$\frac{2}{3}$ as long as the corolla-tube, lower petal gradually dilated at the tip, pedicels longer than the bracts, fruit globose contracted into a neck at the base not retuse.

Fields and waste places; a colonist, *Watson;* fl. May–Sept.—*Stems* 1–2 ft. or more, branched. *Leaves* 2-pinnate; segments broad. *Flower* ½–¾ in. *Racemes* lax-flowered, not much elongated in fruit.—DISTRIB. Europe, N. Africa, W. Asia.

Sub-sp. PALLIDIFLO'RA, *Jordan* (sp.); sepals denticulate ½–⅔ as long as the corolla-tube, petals cream-coloured tipped with purple, fruit longer than broad, neck narrower than the dilated top of the recurved pedicel, with 2 deep pits at the top.—S. W. England.

Sub-sp. BORÆ'I, *Jordan* (sp.); sepals ⅓ as long as and broader than the corolla-tube, petals pale purple tipped with darker, fruit broader than long, neck narrower than the dilated top of the spreading pedicel, with two deep pits at the top.—Common.

Sub-sp. CONFU'SA, *Jordan* (sp.); sepals ⅓ as long and nearly as broad as the corolla-tube, petals pink tipped with purple, fruit subrugose when dry, a little longer than broad, neck broader than the dilated top of the erecto-patent pedicel, with two broad shallow pits at the top. *F. agra'ria*, Mitten.

Sub-sp. MURA'LIS, *Sonder;* flowers smaller and laxer, sepals as in *confu'sa*, corolla rosy tipped with purple, fruit finely rugose when dry, neck narrower than the dilated top of the erecto-patent pedicel, with 2 inconspicuous pits at the top.—England only, rare.

2. **F. officina'lis,** *L.*; diffuse, leaf-segments flat, sepals ovate-lanceolate ⅓ as long and half as broad as the corolla-tube, lower petal abruptly dilated at the tip, pedicel ascending longer than the bracts, fruit depressed-spherical, rugose when dry, with a large shallow pit at the top.

Waste places, ascending to near 1,000 feet in N. of England; a colonist, *Watson;* fl. May–Sept.—Smaller than *F. capreolata*, leaves more divided, flowers smaller and raceme much elongated after flowering. *Flower* dark or pale rose-purple.—DISTRIB. Europe, N. Africa, W. Asia; introd. in U. States.

3. **F. densiflo'ra,** *DC.;* diffuse, leaf-segments flat or slightly channelled, sepals broadly ovate toothed half as long as and broader than the corolla-tube, lower petal abruptly dilated at the tip, pedicels erecto-patent about as long as the bracts, fruit globose rugose when dry, with 2 shallow pits at the top. *F. calyci'na*, Bab.; *micran'tha*, Lagasca.

Waste places, from Forfar and Elgin southwards; a colonist, *Watson;* fl. May–Sept.—Habit of *F. officinalis*, but weaker, leaf-segments smaller and narrower, flowers smaller, racemes short, much elongated after flowering, flower ¼–⅓ in. pale, bracts coloured.—DISTRIB. Europe, N. Africa, W. Asia to India.

4. **F. parviflo'ra,** *Lamk.;* diffuse, leaf-segments flat or slightly channelled, sepals ovate- or linear-lanceolate toothed $\frac{1}{10}$–$\frac{1}{6}$ as long and not half as broad as the corolla-tube, lower petal abruptly enlarged at the tip, pedicels erecto-patent equal to or exceeding the bracts, fruit globose rugose when dry, with 2 pits at the top. *F. tenuisec'ta*, Syme.

Waste places, &c. from Mid. Scotland southwards; a colonist, *Watson;* fl. June–Sept.—Best distinguished by habit, by the narrow leaf-segments, small pale flowers and minute sepals.—DISTRIB. Europe, N. Africa, N. and W. Asia to India.

Sub-sp. PARVIFLO'RA proper; leaf-segments channelled, racemes dense-flowered, sepals triangular-ovate ⅛ as long and ⅓ as broad as the corolla-

tube, pedicels as long as the bracts, fruit pointed at the top. England, rare.

Sub-sp. VAILLAN'TII, *Loisel.* (sp.); leaf-segments flat, racemes lax-flowered, sepals lanceolate ⅓ as long and ⅓ as broad as the corolla-tube, pedicels longer than the bracts, fruit rounded at the top.— Yorkshire and S.E. England.

2. CORYD'ALIS, *DC.*

Erect herbs, with a tuberous rootstock, or weak and diffuse, or slender and climbing by tendrils. *Leaves* much divided, alternate or subopposite. *Racemes* terminal or leaf-opposed. *Sepals* 2, scale-like. *Floral* characters of *Fumaria*, but the ovules more numerous, and fruit an inflated 2-valved capsule. *Seeds* small, raphe often crested.—DISTRIB. Chiefly Mediterranean and Himalayan, a few American and African; species 70.—ETYM. Greek for a *Fumaria*.

1. **C. clavic'ulata,** *DC.*; annual, branched, climbing by branched tendrils terminating the petioles.

Copses, banks, and thatched roofs; ascending to near 1,000 ft.; N.E. of Ireland only; fl. June–Aug.—*Stems* 1–3 ft., brittle, slender. *Leaves* glaucous, pinnate, 3- or digitately 5-foliolate; segments small, ovate or oblong. *Racemes* opposed to the leaves; pedicels very short; bracts cuspidate. *Flowers* ¼ in., straw-coloured; spur very short. *Pods* ¼ in. linear-oblong. *Testa* shining, granulate.—DISTRIB. W. Europe, from Denmark and Germany to Spain.

C. LU'TEA, *DC.*; perennial, root fibrous, stems many diffuse, leaves 2–3-ternately pinnate, raceme leaf-opposed, flowers yellow.

Old walls; an escape from cultivation; fl. May–Aug.—*Rootstock* branched. *Stem* 6–12 in., angular. *Leaves* on long petioles, leaflets oblong-ovate or obovate, entire or lobed. *Peduncles* long; bracts lanceolate, erose. *Flowers* ½–¾ in., subsecund; spur short, thick, incurved. *Pod* oblong, compressed acuminate; style deciduous.—DISTRIB. W. Europe from Belgium southwards.

C. SOL'IDA, *Hook.*; perennial, rootstock tuberous, stem simple, leaves 2–3-ternately pinnate, raceme terminal, flowers purple. *C. bulbo'sa*, DC.

Banks and cultivated ground, naturalized in England; fl. April–May.—Very glaucous. *Rootstock* 1 in. diam. and upwards. *Stem* 6–10 in., stout, with one or two oblong scales below, and a few leaves about the middle. *Leaves* on stout petioles; leaflets broad. *Flowers* 1 in. subsecund, bracts lobed, leafy; spur longer than the rest of the corolla. *Pod* narrow, lanceolate; style persistent. *Cotyledons* connate.—DISTRIB. Europe, from Denmark southwards.

ORDER VI. CRUCIF'ERÆ.

Herbs. *Radical leaves* in a rosette, cauline alternate, exstipulate. *Flowers* racemed. *Sepals* 4, free; 2 lateral (opposite the placentas) often larger and saccate at the base, imbricate in bud. *Petals* 4, free, hypogynous, placed crosswise, imbricate in bud. *Stamens* 6 (rarely 1, 2, or 4), in 2 series; 2 outer opposite the lateral sepals; 4 inner longer, in opposite pairs. *Disk* with usually 4 glands opposite the sepals. *Ovary* 2-celled, by a vertical prolongation of the placentas, or 1-celled,

or with superimposed cells; style short or 0, stigma simple or 2-lobed, lobes opposite the placentas; ovules usually many, 2-seriate on 2 parietal placentas, rarely solitary and erect, amphitropous or campylotropous, raphe ventral, micropyle superior. *Fruit* usually a long or short 2-celled and 2-valved capsule (*pod*); valves deciduous, leaving the seeds on the persistent placentas (*replum*), rarely indehiscent, or transversely jointed with 1-seeded joints. *Seeds* small, albumen 0; cotyledons large, plano-convex or longitudinally folded, foliaceous in germination, radicle turned up on the back of one cotyledon (*incumbent*) or facing their edges (*accumbent*).—DISTRIB. All temp. regions, but chiefly of the Old World; genera 172; species 1,200.—AFFINITIES. Between *Fumariaceæ* and *Capparidæ*.—PROPERTIES. All parts are nitrogenous and contain sulphur, are pungent, stimulant, and anti-scorbutic, often acrid. Seeds oily. Testa of cress and others mucilaginous when moistened, owing to the swelling and bursting of superficial cells.

A. Pod *elongate (much longer than broad), dehiscing throughout its length, flat or turgid, not compressed at right angles to the septum.* (Pod *sometimes short in* Nasturtium, *its tip sometimes indehiscent in* Brassica. *See* Draba *in* B.)

TRIBE I. **ARABID'EÆ.** *Seeds* 1-seriate (rarely 2-seriate in *Arabis* and *Nasturtium*), cotyledons accumbent. (Flowers white, yellow or lilac.)

* *Stigmas erect or decurrent on the style* ..... 1. Matthiola.

** *Stigma small, simple terminal*

Lateral sepals saccate. Hairs forked ..... 1*. *Cheiranthus.*
Pod terete, valves turgid. Seeds minute, 2-seriate ..... 2. Nasturtium.
Pod 4-angled. Seeds oblong ..... 3. Barbarea.
Pod flat, valves not elastic 1-nerved ..... 4. Arabis.
Pod flat, valves elastic. Funicle filiform ..... 5. Cardamine.
Pod flat, valves elastic. Funicle dilated ..... 6. Dentaria.

TRIBE II. **SISYM'BRIEÆ.** *Seeds* usually 1-seriate, cotyledons incumbent, straight, plano-convex. (Flowers white, yellow or lilac.)

Glabrous or hairs spreading, stigma obtuse ..... 7. Sisymbrium.
Hairs appressed 2–3-furcate, stigma obtuse ..... 8. Erysimum.
Hairs spreading, stigmas decurrent on the style ..... 8*. *Hesperis.*

TRIBE III. **BRAS'SICEÆ.** *Seeds* 1–2-seriate, cotyledons incumbent, longitudinally folded or very concave. (Flowers yellow.)

Pod terete or angled. Seeds 1-seriate ..... 9. Brassica.
Pod compressed. Seeds 2-seriate, compressed ..... 10. Diplotaxis.

B. Pod *short (not or not much longer than broad), dehiscing through its whole length, broad, flat or turgid, not compressed at right angles to the septum.* (Flowers *white or yellow.*) (Pod *sometimes long in* Draba; *see* Nasturtium *in* A.)

TRIBE IV. **ALYSSI'NEÆ.** *Seeds* 2-seriate, cotyledons accumbent.

Petals entire. Pod oblong, flat, many-seeded ..... 11. Draba.
Petals 2-cleft. Pod oblong, flat or turgid ..... 12. Erophila.
Petals entire. Pod circular, few-seeded ..... 12*. *Alyssum.*
Petals entire. Pod inflated, many-seeded ..... 13. Cochlearia.

TRIBE V. **CAMELI'NEÆ.** *Seeds* 2-seriate, cotyledons incumbent.

Tall herb, cauline leaves sessile auricled ..... 13*. *Camelina.*
Small scapigerous water-herb. Leaves subulate ..... 14. Subularia.

C. Pod *short, dehiscing throughout its length, much compressed at right angles to the septum, which is hence very narrow.* (Pod *indehiscent in* Senebiera.)

TRIBE VI. **LEPIDI'NEÆ.** *Cotyledons* incumbent, straight incurved or longitudinally folded. (Flowers white.)

Pod dehiscent, many-seeded .....15. Capsella.
Pod didymous, indehiscent, 2-seeded .....16. Senebiera.
Pod dehiscent, 2–4-seeded .....17. Lepidium.

TRIBE VII. **THLASPID'EÆ.** *Cotyledons* accumbent, straight. *Pods* on horizontal pedicels. (Flowers white.)

Pod notched. Petals equal. Filaments without scales.. .....18. Thlaspi.
Pod ovate. Petals very unequal. Filaments without scales .....19. Iberis.
Pod oblong. Petals unequal. Filaments with basal scales....20. Teesdalia.
Pod oblong. Petals equal. Filaments without scales.. ..... 21. Hutchinsia.

D. Pod *indehiscent or with very short valves which cover a few of the seeds only.*

TRIBE VIII. **ISATI'DEÆ.** *Pod* indehiscent, 1-celled, 1-seeded ...21*. *Isatis.*

TRIBE IX. **CAKILI'NEÆ.** *Pod* transversely 2-jointed, lower joint seedless or 2-celled, 2-valved, 2- or more-seeded, upper joint 1–2-celled. (Affinity with *Brassiceæ.*)

Lower joint slender, seedless; upper globose, 1-seeded .....22. Crambe.
Lower joint 2-edged, 1-celled; upper ensiform, 1-seeded .....23. Cakile.

TRIBE X. **RAPHA'NEÆ.** *Pod* elongate, 1-celled, many-seeded; or transversely jointed, the joints 1–2-celled, cells 1-seeded.....24. Raphanus.

1. MATTHI'OLA, *Br.* STOCK.

Herbs, sometimes shrubby, downy with stellate hairs. *Leaves* entire or sinuate. *Flowers* large. *Sepals* erect, lateral saccate at the base. *Petals* with long claws. *Pod* elongate, terete or compressed; septum thick, often 2–3-nerved; stigmatic lobes erect, conniving, often thickened or horned at the back. *Seeds* 1-seriate, compressed, winged or margined; cotyledons accumbent.—DISTRIB. Europe, N. Africa, W. Asia, one is S. African; species 30.—ETYM. After *Matthiolus*, an Italian physician.

1. **M. inca'na,** *Br.*; shrubby, erect, hoary, leaves oblong-lanceolate entire, pod eglandular.

Sea-cliffs eastward of Hastings (now extinct), Ventnor and Freshwater, Isle of Wight; a denizen, *Watson*; fl. May–June.—*Stem* 1–2 ft., branched. *Leaves* rarely obscurely toothed. *Raceme* 1–2 in. *Flowers* 1–2 in. diam., purple to violet. *Pod* 2–4 in., ¼ in. broad. *Seed* orbicular, winged.—DISTRIB. W. Europe, Canaries, Levant. The "Queen Stock" of gardens, where it is treated as an annual or biennial.

2. **M. sinua'ta,** *Br.*; herbaceous, diffuse, woolly or downy, leaves linear-obovate or -oblong, lower sinuate-toothed, pod muricate and glandular.

Shores of Wales, Cornwall, Devon, S.E. and S.W. Ireland, Channel Isles; fl. May–Aug. — *Stem* 1–2 ft., branched above. *Root-leaves* petioled. *Raceme* 1–3 in. *Flowers* 1 in. diam., pale lilac, fragrant at night. *Pod* 3–4 in., ⅛ in. broad; seeds winged.— DISTRIB. W. Europe, N. Africa, Levant. —Taste alkaline.

1*. *CHEIRAN'THUS, L.* WALLFLOWER.

Herbs or under-shrubs, pubescent with appressed 2–partite hairs. *Leaves* entire or toothed. *Flowers* large, racemed, yellow or purple. *Sepals* erect,

lateral saccate at the base. *Petals* with long claws. *Pod* elongate, compressed or 4-angled; valves 1-nerved, flat or convex; stigma capitate or with 2 spreading lobes. *Seeds* 1-seriate, compressed, cotyledons accumbent. —DISTRIB. N. temp. and cold regions; species 12.—ETYM. doubtful.

C. CHEI'RI, *L.*; leaves lanceolate acute entire.

Old walls; naturalized; an alien, *Watson;* fl. May–June.—Perennial. *Stem* shrubby below, branched, angled. *Leaves* 2–3 in. *Racemes* usually short. *Flowers* about 1 in. diam. fragrant, orange-yellow (in cultivation red, purple or brown). *Pod* 1–2½ in., 4-angled; stigma almost sessile; seed shortly winged above.—DISTRIB. Central and N. Europe.

2. NASTUR'TIUM, *Br.*

Branched, terrestrial or aquatic glabrous herbs; hairs if present usually simple. *Leaves* entire lobed or cut. *Flowers* small, usually yellow, sometimes bracteate. *Sepals* short, equal, spreading. *Petals* slightly clawed, or 0. *Stamens* 1–6. *Pod* short or long, often curved, terete, pedicels patent and curved, valves not rigid, convex, obscurely 1-nerved; style short or long, stigma simple or 2-lobed. *Seeds* 2-seriate, small, turgid; cotyledons accumbent.—DISTRIB. N. temp. and warmer regions; species about 20.—ETYM. doubtful.—United with *Cochlearia* by *C. Armoracia* (Horse-radish) and others.

1. **N. officina'le,** *Br.*; aquatic, leaves pinnate, leaflets subcordate sinuate-toothed, petals white twice as long as the sepals, pod linear. *Watercress.*

Watercourses, ascending above 1,000 feet in the N. of England; fl. May–Oct. —Perennial, glabrous, green or olive-brown. *Stem* 2–4 ft., rooting, often floating, fistular. *Leaflets* 3–6 pair. *Flowers* ⅛–¼ in. diam. *Racemes* short. *Hypogynous glands* 4. *Pods* ½–1 in., deflexed or horizontal, longer than their pedicels; valves beaded; seeds suborbicular, compressed.—DISTRIB. Europe. W. Asia, N. Africa; introd. in N. America and the colonies, and choking some rivers of N. Zealand, where the stem grows as thick as the wrist.

VAR. 1, *officina'le* proper; decumbent, terminal leaflet broadest and largest.—VAR. 2, *silfo'lium,* Reich. (sp.); erect, tall, terminal leaflet oblong, all nearly equal.

2. **N. sylves'tre,** *Br.*; rootstock creeping, leaves deeply pinnatifid, leaflets many, lanceolate more or less cut nearly equal, petals yellow twice as long as the sepals, pod linear, seeds hardly 2-seriate.

Moist waste places from the Forth and Dumfries southwards, rare in the north; S. of Ireland, rare; fl. June–August.—*Stem* angular, flexuous. *Leaves* very variable. *Racemes* short; flowers ¼ in. diam. Hypogynous glands 6. *Pod* ½–¾ in., curved, pedicel very slender longer or shorter than the pod; seeds minute.—DISTRIB. Europe, N. Africa, temp. and subtrop. Asia; introd. in America.

3. **N. palus'tre,** *DC.*; leaves lyrate pinnatifid, segments few broad unequally cut, terminal of the lower leaves very large, petals yellow equalling the sepals or shorter, pod oblong turgid. *N. terrestre,* Sm.

Damp places from Argyle and Forfar southwards; fl. June–Oct.—*Root* fibrous. *Stem* 1–2 ft., erect or inclined. *Leaves* pinnate or pinnatifid, terminal leaflet

sometimes 6 in. *Flower* ⅛ in. diam. *Pod* about as long as its pedicel; style very short. *Seeds* angular.—DISTRIB. Europe (Arctic), N. Africa, temp. and cold Asia and America.

4. **N. amphib'ium,** *Br.*; rootstock short stoloniferous, leaves entire toothed or pinnatifid, petals yellow twice as long as the sepals, pod oblong shorter than its pedicel. *Armora'cia,* Koch.

Wet places in England and Ireland; doubtfully native in Scotland; fl. June–Sept.—*Stem* 2–4 *ft.*, erect. *Leaves* pinnatifid chiefly when submerged, base often ½-amplexicaul. *Flowers* ¼ in. diam. *Pod* ¼ in., pedicels spreading or deflexed; style slender; stigma large, capitate; seeds small, oblong.—DISTRIB. Europe, N. Africa, temp. Asia.

3. BARBARE'A, *Br.* WINTER-CRESS.

Erect, branched, glabrous, biennial herbs. *Stem* angular. *Leaves* entire lobed or pinnatifid. *Flowers* yellow, sometimes bracteate. *Sepals* suberect, equal. *Petals* clawed. *Pod* linear-elongate, compressed, 4-angled, acuminate; valves keeled or ribbed; style short, stigma capitate or 2-lobed. *Seeds* 1-seriate, oblong, not margined; cotyledons accumbent.—DISTRIB. All temp. regions; species about 6.—ETYM. Dedicated to St. Barbara.—The usually straight and stiff pods, with keeled valves, 1-seriate seeds, and habit, chiefly separate this from *Nasturtium.*

1. **B. vulga'ris,** *Br.*; leaves toothed or pinnatifid at the base, pod short 4-gonous acuminate broader than its slender pedicel, style straight distinct.

Hedgebanks, water-sides, from the Clyde and Elgin southwards; fl. May–Aug.—*Stem* rigid, erect, angled, glabrous, simple or sparingly branched. *Lower leaves* pinnate, rarely pinnatifid, terminal leaflet usually largest; upper subentire or pinnatifid with amplexicaul auricled bases. *Flowers* small, bright yellow. *Pods* ¾–1 in.; style ⅛ in.—DISTRIB. Europe, temp. Asia, S. Africa, Australia, and N. America; ascends to 17,000 ft. in the Himalaya.

Sub-sp. VULGA'RIS proper; raceme about as long as broad, petals twice as long as the sepals, pods in a dense raceme 3–6 times as long as their pedicels erect rarely spreading, seed 1½ times as long as broad.—Common.

Sub-sp. ARCUA'TA, *Reich.* (sp.); raceme elongate, petals rather more than twice the length of the sepals, pods in a lax raceme arched and spreading when young 5–8 times as long as their pedicels, seed more than twice as long as broad.—Rare, Loughgall, Armagh.

Sub-sp. STRIC'TA, *Andrz.* (sp.); terminal segment very large, pods in a dense narrow raceme erect 4–6 times as long as their pedicels, seed nearly twice as long as broad.—Rare, Yorkshire, Northampton, Essex. Attains Arctic Europe.

Sub-sp. INTERME'DIA, *Boreau* (sp.); leaf-segments many, petals twice as long as the sepals, pods in a dense raceme erect 4–6 times as long as their pedicels, seeds nearly as long as broad.—Cultivated fields, probably introduced.—Intermediate between *B. vulgaris* and *præcox.*

B. PRÆ'COX, *Br.*; leaves pinnatifid, segments narrow, petals 3 times as long as the sepals, pods long and distant scarcely thicker than their very stout short pedicels, style very short. *American Cress.*

Roadsides, &c., a garden escape; an alien, *Watson;* fl. April–Oct.—Very similar to the preceding, of which I suspect it is a cultivated form. *Seeds*

¼ longer than broad, twice as large and more orbicular than in *B. vulgaris*. —DISTRIB. All Europe; introd. in U. States.—An excellent salad.

4. AR'ABIS, *L.* ROCK-CRESS.

Annual or perennial herbs, glabrous or with forked or stellate hairs. *Radical leaves* spathulate; cauline sessile. *Flowers* usually white. *Sepals* short, equal, or the lateral saccate at base. *Petals* entire, usually clawed. *Pod* linear, compressed; valves flat, keeled, veined or ribbed; stigma simple or 2-lobed. *Seeds* 1- rarely sub-2-seriate, compressed, often margined or winged; cotyledons accumbent.—DISTRIB. N. temp. zone; species 60.—ETYM. From Arabia, the native country of various species. —Differs from *Cardamine* chiefly in the more strongly keeled non-elastic pod.

1. **A. petræ'a,** *Lamk.*; leaves petioled radical lyrate-pinnatifid, cauline subentire, petals spreading broad clawed, pods spreading. *A. hisʹpida*, L.; *Cardamiʹne hastulaʹta*, Sm.

Alps of N. Wales, Shetland, Skye, Cairngorm Mts. and Braemar, ascending above 4,000 ft., Glenade Mt. Leitrim; fl. June–Aug. — Glabrous or hairy, perennial. *Stem* 3–6 in., branched below. *Leaf-segments* short. *Flowers* corymbose, white or purplish. *Pods* ½–1 in.; valves 3-nerved. *Seeds* hardly winged.—DISTRIB. Alpine and Arctic Europe, N. Asia and N. America.

2. **A. striʹcta,** *Huds.*; hispid, radical leaves subpetiolate small obtuse sinuate-lobed, cauline few ½-amplexicaul, petals narrow cuneate suberect, pods suberect.

Rocks, Bristol and Cheddar, very rare; fl. March–May.—Perennial. *Stems* 5–10 in., ascending or erect. *Radical leaves* ciliate, hairs forked and simple; lobes oblong or triangular, pointing upwards. *Flowers* rather large, cream-coloured. *Pods* 1 in., 3–6 times as long as their pedicels; valves 1-nerved; style short; seeds oblong, slightly winged above.—DISTRIB. Central Europe, from Spain to Hungary.—Habit of *Sisymb. Thaliaʹna*.

3. **A. ciliaʹta,** *Br.*; ciliate or hairy, stem leafy, radical leaves entire subsessile obovate-oblong obtuse slightly toothed, cauline sessile, petals suberect white, pods erect.

Sandy and rocky shores, Galway and S. Wales; fl. July–Aug.—*Rootstock* short, stout, perennial. *Stem* 4–6 in., strict, rigid, quite erect. *Leaves* ¾–1 in., cauline sessile. *Flowers* ¼ in. diam. *Pods* few, 1–1½ in., ⅛ in. broad, strict, beaded; pedicels short; valves 1-nerved; seeds contiguous, narrowly winged all round.—DISTRIB. Central Europe.—Perhaps a sub-species of *A. hirsuta*, as considered by Syme.

VAR. 1, *ciliaʹta* proper; leaves ciliate.—Seashore, Connemara, Kerry, and Cork.—VAR. 2, *hisʹpida*, Syme; leaves hispid, hairs forked.—Tenby in S. Wales.

4. **A. hirsuʹta,** *Br.*; hispid, stem leafy, radical leaves subpetiolate toothed, cauline sessile or ½-amplexicaul, petals spreading white, pods many slender erect. *A. sagittaʹta*, DC.; *Turritʹis hirsuʹta*, L.

Dry places, ascending to 2,700 ft. in Scotland, local in Ireland; fl. June–Aug. —*Rootstock* biennial or perennial. *Stems* 1–2 ft., many, slender. *Leaves* 1½–

3 in., obtuse or acute. *Flowers* small. *Pods* 1½–2 in., very many, much narrower than in *A. ciliata;* style short; seeds distant, very narrowly winged all round.—DISTRIB. Europe, temp. Asia to the Himalaya, N. America.

VAR. 1, *hirsu'ta* proper; stem and leaves covered with simple or forked hairs. —VAR. 2, *glabra'ta*, Syme; stem and leaves glabrous or ciliated.—Great Arran Is., W. of Ireland; (this I have not seen.)

5. **A. perfolia'ta,** *Lamk.*; nearly glabrous, glaucous, radical leaves obovate sinuate or lobed, cauline amplexicaul entire auricled, petals erect pale yellow, pods many crowded slender erect, seeds sub-2-seriate. *Turrit'is gla'bra*, L.

Dry rocky places, local, from Perthshire southwards; Ireland, Antrim only; fl. May–July.—Annual or biennial. *Stem* 2–3 ft., erect, with few spreading hairs about the early withering root-leaves, &c. *Pods* 1–2 in., pedicels slender; style very short; seeds minute, oblong, angled, not winged.—DISTRIB. Europe (Arctic), temp. Asia to the Himalaya, N. America.

A. TURRI'TA, *L.*; stellately pubescent, leaves remotely toothed, radical petioled entire, cauline narrow oblong amplexicaul, flowers bracteate, petals obovate-lanceolate spreading, pods large long secund decurved.

Naturalized on old castle walls, as at Cleish, Kinross-shire, Oxford, &c.; fl. May–July. Perennial. *Stem* 1–2 ft., rather robust, leafy. *Radical leaves* on barren branches of the rootstock. *Flowers* pale yellow. *Pods* 3–6 in.; valves thick, veined; seeds oblong, winged.—DISTRIB. Central and S. Europe.

5. CARDAMI'NE, *L.* BITTER-CRESS.

Annual or perennial herbs, usually glabrous. *Leaves* usually pinnate. *Flowers* white cream-coloured or purple. *Sepals* equal at the base. *Petals* clawed, rarely 0. *Pod* elongate, linear, compressed; valves flat, indistinctly nerved, elastic; septum hyaline; stigma small. *Seeds* compressed, not margined, funicle filiform; cotyledons accumbent.—DISTRIB. Temp. and cold regions, rarely tropical; species 50.—ETYM. A Greek word.

1. **C. hirsu'ta,** *L.*; radical leaves pinnate, leaflets broad petioled auricles 0, cauline narrower, petals small erect oblong-lanceolate, anthers yellow, pods erect.

Moist places, ascending to 3,000 ft. in Scotland; fl. April–Sept.—Very variable, glabrous or hairy, 6 in.–2 ft., erect or diffuse. *Leaflets* 3–6 pairs, angled or sublobate. *Flowers* ⅛ in. diam., white. *Pods* about 1 in., slender, torulose.—DISTRIB. All temp. and cold climates; in S. temp. regions the perennial varieties are excessively numerous and very puzzling.

Sub-sp. HIRSU'TA proper; annual, radical leaves rosulate, stamens usually 4, style short stout.—Open ground.

Sub-sp. FLEXUO'SA, *Withering* (sp.); perennial or biennial, radical leaves few, leaflets lobed, stamens usually 6, style slender elongate. *C. sylvat'ica*, Link.—Shaded places.

2. **C. praten'sis,** *L.*; leaves all pinnate, leaflets of radical petioled suborbicular, of cauline narrow subsessile, petals large spreading obovate, anthers yellow, pods erect on slender pedicels, style short stout. *Lady's Smock, Cuckoo Flower.*

Moist meadows, ascending to 3,200 ft. in Scotland; fl. April–June. — *Rootstock* short, stout, sometimes stoloniferous. *Stem* 1–2 ft. *Leaflets* of radical leaves ¼–¾ in.; of cauline usually much longer, almost entire. *Flower* ½–¾ in. diam., lilac or almost white. *Pods* 1–1½ in.; pedicels ½–1 in. — DISTRIB. N. temp., Arctic and sub-Arctic regions. — A similar plant occurs in Tasmania.

3. **C. ama'ra,** *L.*; leaves pinnate, radical leaflets suborbicular, cauline narrow or deeply toothed, petals large obovate spreading, anthers purple, pods erect on slender pedicels, style slender.

River-sides, &c. scarce; from Mid. Scotland southwards, ascending to near 1,000 ft. in Yorkshire; N.E. Ireland; fl. April–June.—*Rootstock* slender, stoloniferous. *Stem* 1–2 ft., ascending, glabrous or hairy. *Leaves* all alternate. *Flowers* ½ in. diam., racemed or panicled. *Petals* white, creamy. *Pods* 1–1½ in., pedicels ½–¾ in.; style slender, stigma minute.— DISTRIB. N. Europe and Asia to the Himalaya.

4. **C. Impa'tiens,** *L.*; leaves pinnate, petioles with stipuliform fringed auricles, leaflets all narrow deeply cut, petals linear-obovate or 0, anthers yellow, pods erect on short slender pedicels, style slender.

Shady copses, &c. local; from York (ascending to near 1,000 ft.) and Denbigh southwards; absent in Scotland and Ireland; fl. May–Aug.—*Rootstock* spindle-shaped. *Stem* 1–2 ft., stout, erect, very leafy, glabrous. *Leaflets* many, petioled. *Flowers* ¼ in. diam., often panicled, white. *Pods* ¾–1 in., very slender; pedicels ¼ in.—DISTRIB. Europe, temp. Asia to the Himalaya.— The stipuliform auricles, reflexed on the stem, are anomalous structures.

6. DENTA'RIA, *L.* CORAL-ROOT.

Herbs with creeping, scaly rootstocks. *Radical leaves* few or 0; cauline often opposite or 3-nately whorled. *Flowers* large, purple. *Sepals* erect, equal at the base. *Petals* clawed. *Pod* narrow-lanceolate; valves flat, nearly nerveless, elastic; septum membranous. *Seeds* 1-seriate, compressed, not margined, funicle dilated; cotyledons accumbent, stalked.—DISTRIB. N. temp. regions; species about 20.—ETYM. *dens,* from the scaly rootstock. —Differs from *Cardamine* chiefly in habit, and the funicles.

1. **D. bulbif'era,** *L.*; lower leaves pinnate, upper simple entire.

Woods and copses, rare, Sussex, Middlesex, Kent, Surrey, Bucks; doubtfully a native of Perth, Ayr, and Lanark; absent from Ireland; fl. April–June. —*Rootstock* annual or biennial, white. *Stem* 1–2 ft., simple, leafless below. *Leaves* with few pairs of oblong, entire or serrate ciliate leaflets 1–2 in.; the uppermost leaflets confluent at the base; upper leaves with bulbs in their axils. *Flowers* ½–¾ in. diam., white or lilac; pedicels slender. *Pods* erect, rarely ripening.—DISTRIB. Throughout Europe, rare in W. Asia.

7. SISYM'BRIUM, *L.* HEDGE-MUSTARD.

Annual or biennial herbs; hairs always simple. *Radical leaves* spreading; cauline alternate, often auricled. *Flowers* loosely racemed, usually yellow, often bracteate. *Sepals* short or long. *Petals* often narrow and long-clawed. *Pod* narrow-linear, terete or 4–6-angled or compressed; valves concave or convex, often 3-nerved; septum membranous, nerveless or 2-nerved; stigma simple 2-lobed or cup-shaped. *Seeds* many, 1-seriate, not margined; cotyledons incumbent.—DISTRIB.

Temp. and cold N. hemisphere; rare in the Southern; species 80.—ETYM. doubtful.—Differs from *Brassica* only in the flat cotyledons, and is united to *Arabis* by *S. Thaliana*. The British species present 4 types of pod, represented by 1. *S. Thaliana, Irio,* and *Sophia;* 2. *S. officinale;* 3. *S. polyceratium;* 4. *S. Alliaria.*

1. **S. Thalia'na,** *Hook.*; leaves toothed pubescent, flowers white, pods spreading or ascending obscurely 4-angled. *Thale-cress.*

Dry soils, ascending to 1,500 ft. in Yorkshire; fl. May–Sept.—Annual. *Stem* 6–10 in., slender, nearly leafless. *Radical leaves* rosulate, oblong, petioled; caulino narrow, sessile, all entire or toothed. *Flowers* ⅛ in. diam.; pedicels slender. *Pods* ½–¾ in., slender, curved; seeds minute; cotyledons usually incumbent.—DISTRIB. Europe (Arctic), Asia to the Himalaya, N. Africa; introd. in N. America.

2. **S. Ir'io,** *L.*; leaves runcinate-toothed or pinnatifid glabrous, flowers yellow, pods terete slender suberect. *London Rocket.*

Old walls, &c., Berwick-on-Tweed and Dublin; sporadic in other places; a denizen, *Watson;* fl. July–Aug.—Annual or biennial. *Stem* 1–2 ft., branched. *Radical leaves* petioled; lobes irregularly toothed, terminal large often hastate. *Flowers* ⅛ in. diam. *Pods* 1½ in., very many, glabrous, erect, strict, very slender; valves beaded, 3-nerved; style 0; seeds oblong.—DISTRIB. Central and S. Europe, N. Africa, W. Asia to the Himalaya.—Called "London Rocket" because it sprang up abundantly after the Great Fire of 1666.

3. **S. Sophi'a,** *L.*; leaves 2–3-pinnatifid glabrous or downy, segments narrowly linear, flowers yellow, pods slender terete ascending curved, pedicels very slender. *Flixweed.*

Waste places, rarer in Scotland and Ireland; fl. June–Aug.—Annual. *Stem* 1–3 ft., branched above; branches spreading and ascending, leafy. *Leaves* 2–4 in., finely divided; lobes spreading. *Flowers* ⅛ in. diam. *Pods* 1 in., in long racemes; valves beaded, 3-ribbed; style very short.—DISTRIB. Europe (Arctic), N. Africa, West Asia to the Himalaya, N. and S. America.

4. **S. officina'le,** *L.*; leaves runcinate-toothed or -lobed hairy, flowers yellow, pods in a leafless raceme subulate terete appressed to the stem. *Hedge-mustard.*

Hedgebanks and waste places; fl. June–July.—*Stem* 1–2 ft., terete, erect, with spreading or reflexed hairs; branches horizontal. *Leaves* variously cut or lobed, with a tendency to a large terminal lobe. *Flowers* ⅛ in. diam. *Pods* ½ in., tapered from the base into the almost pungent style; pedicels short, thick.—DISTRIB. Europe, W. Asia to the Himalaya, N. Africa; introd. in the U. States.

5. **S. Allia'ria,** *Scopoli;* leaves all petioled deltoid or reniform-cordate coarsely toothed or crenate pilose beneath, pods stout long 4-angled, pedicels short stout. *Erysimum,* L.; *Alliaria,* Andrz. *Garlic-mustard, Sauce alone, Jack by the hedge.*

Hedgebanks, &c., ascending to near 1,000 ft. in England; rarer in N. Scotland and Ireland; fl. May–June.—Annual or rarely biennial, glabrous or with a few scattered simple hairs, rank scented. *Stem* 2–3 ft., decumbent at the base, then flexuous, erect, simple or sparingly branched. *Radical leaves* often 3 in. diam., on long slender petioles, smaller and more reniform than

the cauline, which are cuneate at the base. *Flowers* ¼ in. diam. *Pods* 2½ in., linear, slightly curved, rigid, subacute; valves keeled, style very short, stigma truncate. *Seeds* oblong; funicle dilated.—DISTRIB. Europe, N. Africa, temp. and W. Asia to the Himalaya.

S. POLYCERA'TIUM, *L.*; prostrate, leaves runcinate-pinnatifid glabrous, flowers yellow, pods 1–3 in the axils of leafy bracts cylindric curved spreading.

Roadside paths near Bury St. Edmunds, where introduced by Dr. Goodenough; fl. July–Aug.—Annual, glabrous, very leafy. *Leaves* often reduced to the large triangular coarsely toothed terminal lobe. *Flowers* small, yellow. *Pods* ½ in., in short leafy racemes, bread at the base, on very short thick pedicels; valves 3-nerved, very convex, beaded, obtuse; style evident, short, thick, stigma obtuse.—DISTRIB. S. of France and Mediterranean to the Caucasus.

8. ERYSI'MUM, *L.* TREACLE-MUSTARD.

Annual biennial or perennial hoary herbs, hairs appressed forked. *Leaves* narrow, entire. *Flowers* yellow, often fragrant. *Sepals* erect, equal or the lateral gibbous at the base. *Petals* clawed. *Pod* narrow, compressed, 4-angled or terete; valves linear, often keeled; replum usually prominent; septum membranous or corky; stigma 2-lobed or entire. *Seeds* many, 1-seriate, oblong, not winged or winged at the tip; cotyledons incumbent.—DISTRIB. Temp. and cold N. hemisphere; species about 70.—ETYM. ἐρύω, to draw blisters.—Near *Sisymbrium*, but cauline leaves never auricled, and hairs 2–3-partite; differs from *Cheiranthus* in the cotyledons, and generally in the stigma.

1. **E. cheiranthoi'dēs,** *L.*; leaves lanceolate, pods short suberect.

Waste places in the S. of England; rarer in the N. and in Ireland; a colonist, *Watson;* fl. June–Aug.—Annual. *Stem* 1–2 ft., erect, leafy, rigid, terete. *Leaves* 3–4 in., subsessile, lanceolate or oblong-lanceolate, acute, narrowed at the base, obscurely toothed. *Flowers* ¼ in. diam. *Pods* 1 in., straight; pedicels spreading; valves strongly keeled, acute; style very short, stout, stigma truncate; seeds oblong, smooth, very strong-tasted.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, N. America.

8*. *HESPERIS,* *L.* DAME'S VIOLET.

Erect, biennial or perennial herbs. *Leaves* alternate, entire. *Flowers* large, handsome. *Sepals* erect, lateral gibbous at the base. *Petals* clawed. *Pod* elongate, terete or 4-angled; valves flattish, keeled, 3-nerved; septum membranous; stigmatic lobes suberect. *Seeds* many, margined or not; cotyledons incumbent.—DISTRIB. Europe and temp. Asia; species 20.—ETYM. ἑσπερος, from some species being odorous in the evening.—Very near *Matthiola* and *Cheiranthus*, differing chiefly in the stigmas and cotyledons.

H. MATRONA'LIS, *L.*; leaves oblong-lanceolate acuminate.

Meadows, plantations, &c., an escape, not even naturalized; fl. May–July.—Pubescent with simple or branched hairs. *Root* perennial. *Stems* 2–3 ft. few or solitary, erect, stout, leafy. *Leaves* 2–5 in., shortly petioled or sessile, finely irregularly toothed or serrate. *Flowers* ¾ in. diam., white or lilac, odorous in the evening; pedicels ½ in., spreading. *Pods* 2–4 in., slender, cylindric, contracted here and there between the remote seeds; pedicels

ascending; valves much narrowed at the tip; style stout; seeds linear-oblong.—DISTRIB. Europe, temp. Asia.

9. BRAS'SICA, *L.* CABBAGE, &c.

Herbs of various habit. *Leaves* entire or pinnatifid, often large. *Flowers* in long racemes, white or yellow, rather large. *Sepals* erect or spreading, equal or the lateral saccate at the base. *Pod* elongate, nearly terete, with sometimes an indehiscent 1-seeded beak; valves convex, often 3-nerved, the lateral nerves flexuous; septum membranous or spongy; stigma truncate or 2-lobed. *Seeds* 1-seriate, oblong or subglobose; cotyledons incumbent, concave or conduplicate.—DISTRIB. Temp. Europe, Asia, and N. Africa; species 100.—ETYM. The Latin name.

SECTION 1. **Brassica** proper. *Sepals* erect.

1. **B. olera'cea,** *L.*; rootstock stout branched leafy at the top, leaves obovate lobed or sinuate below glaucous glabrous, upper sessile oblong dilated at the base, flowering racemes elongate, beak of pod seedless, valves keeled and nerved. *Wild Cabbage.*

Sea-cliffs, S.W. of England, Wales, and Ireland; naturalized here and there elsewhere and in Scotland; a denizen? *Watson;* fl. May–Aug.—*Stems* 1–2 ft., biennial or perennial, as thick as the finger or thicker, tortuous, usually decumbent, scarred. *Lower leaves* often 1–1½ ft. *Flowers* 1 in. diam., pale yellow. *Pods* 2–3 in., spreading, slightly compressed; beak short, subulate; seeds globose.—DISTRIB. W. and S. coasts of Europe. The chief cultivated forms are *forma acéph'ala* (Scotch kail, cow cabbage, borecole); *f. bullea'ta* and *gemmif'era* (Brussels sprouts and Savoys); *f. capita'ta* (red and white cabbage); *f. caulora'pa* (Cole rabi or Kohl-Rebe); *f. Botry'tis* (cauliflower and broccoli).

2. **B. campes'tris,** *L.*; erect, lower leaves lyrate-pinnate, upper oblong or *lanceolate amplexicaul* and auricled at the base, flowering racemes *corymbiform, beak of pod seedless, valves* 1-nerved. *B. polymor'pha,* Syme. *Weeds of cultivated ground*; a colonist? *Watson;* fl. June–Sept.

The following is Mr. Syme's arrangement of the forms of *Brassica campes'tris,* which he includes under the aggregate name of *polymor'pha,* a good one, but which should not supersede the Linnean. All are annual or biennial. Probably none are wild in this or any other country; *B. campestris* proper may be a starved form of one of the others, though it appears more reasonable to regard it as their parent.—DISTRIB. All Europe, temp. and sub-trop. Asia, where the turnip is cultivated up to 15,000 ft. in the Himalaya.

Sub-sp. CAMPES'TRIS proper; root tuberous, leaves glaucous, radical hispid, upper glabrous, petals persistent till the corymb lengthens. *Swedish turnip.*—Extends into Arctic Europe.

Sub-sp. NA'PUS, *L.* (sp.); root fusiform, leaves all glabrous and glaucous, petals deciduous before the corymb lengthens. *Rape, Cole-seed*—yields *Colza* and *Carcel* oils.

Sub-sp. RA'PA, *L.* (sp.); root tuberous, lower leaves not glaucous hispid, upper glaucous and glabrous, petals deciduous. *Turnip.*

3. **B. monen'sis,** *Huds.*; leaves petioled deeply pinnatifid, segments toothed, upper linear, beak of pod 1–3-seeded, valves 3-nerved.

Sea-shores on the west coasts from Skye to S. Wales, Channel Is.; fl. May–June.—*Rootstock* usually stout, woody and perennial. *Stem* 6–24 in., erect or

decumbent. *Radical leaves* with short broad toothed segments. *Flowers* ⅓–½ in. diam., pale yellow. *Pods* 1½–2½ in., spreading; beak thick; seeds globose dark, punctate.—DISTRIB. Shores of W. and S. Europe and N. Africa.

Sub-sp. MONEN'SIS proper, glabrous, stem nearly simple, leaves chiefly radical. S. Wales to Skye; inland at Merthyr Tydfil, S. Wales.

Sub-sp. CHEIRAN'THOS, *Villars* (sp.); hispid, stem branched leafy. — St. Aubyn's Bay, Jersey, Alderney.

SECTION 2. **Sina'pis,** *L.* (Gen.) *Sepals* spreading.

* *Pods erect, appressed to the stem; valves* 1-*nerved; cells few-seeded.*

4. **B. ni'gra,** *Boiss.*; stem-leaves petioled linear-lanceolate entire or toothed glabrous, pods subulate 4-angled glabrous, beak short seedless. *Black Mustard.*

Hedges and waste places, common as an escape, wild on sea-cliffs (*Syme*); rare in Scotland; a doubtful native in S. of Ireland; a native? *Watson;* fl. June-Sept.—Annual. *Stem* 2–3 ft., rigid, branched, more or less hispid. *Leaves* 4–8 in., lower lyrate, terminal lobe much the longest. *Flowers* ½–⅔ in. diam., bright yellow. *Pod* ¾–1 in., subulate, beak slender, valves keeled, torulose; pedicels short, stout, erect; cells 3–5-seeded; seeds oblong.—DISTRIB. Europe, N. Africa, W. Asia to the Himalaya; introd. in U. States.

5. **B. adpres'sa,** *Boiss.*; uppermost stem-leaves linear or lanceolate quite entire hispid, pods subcylindric, beak clavate ribbed ¼ as long as the valves often 1-seeded. *Sina'pis inca'na,* L.

Sandy fields, Jersey and Alderney; fl. July–Aug.—Habit of *B. nigra,* but more branched; pod very short (½ in.); valves linear; beak 8-ribbed; seeds fewer, flattened.—DISTRIB. Europe, from Belgium southwards.

** *Pod spreading; valves* 3-*nerved; cells few or many-seeded.*

6. **B. Sinapis'trum,** *Boiss.*; hispid, upper leaves toothed or lyrate, pods linear angular longer than the elongate compressed rarely 1-seeded beak. *Sina'pis arven'sis,* L. *Charlock.*

Cornfields, ascending to 1,200 ft.; a colonist or likely a native, *Watson;* fl. May–Aug.—Annual. *Stem* 1–2 ft., usually branched. *Leaves* lyrate-pinnatifid, toothed. *Flowers* ½–¾ in. diam., subcorymbose, bright yellow. *Pods* 1½–2 in.; pedicels slender, spreading; valves torulose; beak deciduous, straight, almost rigid, as broad as the hispid valves; seeds subcompressed, dark brown.—DISTRIB. Europe, N. Africa, N. and W. Asia to the Himalaya; introd. in America.

7. **B. al'ba,** *Boiss.*; hispid with reflexed hairs, upper leaves pinnatifid, pods short beaded few-seeded, valves equalling the broad sometimes 1-seeded beak. *Sinapis,* L. *White Mustard.*

Cultivated ground, &c. from Mid. Scotland southwards; Mid. Ireland rare; a colonist, *Watson;* fl. June–July.—Annual. *Stem* 1–3 ft., erect, furrowed, branches ascending. *Leaves* all lyrate-pinnatifid or pinnate; segments cut and lobed. *Flowers* ½ in. diam., yellow. *Pods* 2 in., hispid; valves strongly ribbed, concave; beak ensiform, persistent, ribbed, often curved; cells 1–3-seeded; seeds subglobose, pale.—DISTRIB. Europe, N. Africa, N. and W. Asia to the Himalaya; introd. in the U. States.—Cultivated as a salad.

10. DIPLOTAX'IS, *DC.* ROCKET.

Annual or perennial herbs. *Leaves* pinnatifid. *Flowers* yellow. *Sepals* spreading, equal. *Pod* narrow, elongate, compressed; valves 1-nerved; septum membranous; style usually slender; stigma simple. *Seeds* many, sub-2-seriate, compressed; cotyledons as in *Brassica.*—DISTRIB. Temp. Europe, Asia, and N. Africa; species 20.—ETYM. διπλόος and τάξις, from the 2-seriate seeds.—Differs from *Brassica* in the flat pods, membranous valves, minute compressed 2-seriate seeds, and the flowers varying to pink or purplish, which is never the case in *Brassica.*

1. **D. murā'lis,** *DC.*; stem hispid leafy at the base, leaves sinuate or pinnatifid, scapes slender ascending, pods suberect linear. *Sisym'brium,* L. *Bras'sica brevi'pes,* Syme.

Roadsides and waste places, from Wales and Suffolk southwards; rare in Scotland and Ireland; a denizen, *Watson;* fl. Aug.–Sept.—A small plant. *Leaves* usually long-petioled. *Scapes* 6–8 in., slender, ascending. *Flowers* ¼ in. diam., yellow. *Pods* 1–2 in., slender, compressed, narrowed above and below; valves flat, almost nerveless; style stout, straight, cylindric; seeds many, small, compressed.—DISTRIB. W. Europe, from Belgium southwards, N. Africa.

Sub-sp. MURA'LIS proper; scapes few-leaved, pedicels as long as the expanded flowers, petals 2–3 times as long as the sepals abruptly obovate, style not narrowed below.—VAR. 1, *muralis* proper; annual, stem-leaves few or 0.—VAR. 2, *Babingto'nii,* Syme; biennial or perennial, stem-leaves several.—S. of England, common, rarer in Scotland; E. of Ireland, very rare; a denizen, *Watson.*

Sub-sp. VIMIN'EA, *DC.* (sp.); scapes leafless, pedicels shorter than the expanded flowers, petals not twice the length of the sepals obovate gradually narrowed into the claw, style narrowed towards the base.—St. Peter Port, Guernsey.

2. **D. tenuifo'lia,** *DC.*; stem branched leafy, leaves pinnatifid, lobes long narrow, pods suberect linear on very long slender pedicels. *Sisymbrium,* L.; *Sinapis,* Sm.; *Brassica,* Boiss.

Roadsides, old walls, &c. from Fife southwards; a denizen, *Watson;* fl. June–Sept.—Bushy, glabrous or hispid, glaucous. *Rootstock* woody; branches 1–3 ft. *Leaves* 3–5 in., lobes distant, very unequal. *Flowers* ½ in. diam., yellow. *Pods* ½–¾ in. distant, linear, narrowed at both ends; valves flat; style stout, straight, cylindric; seeds many, small, compressed. DISTRIB. Europe, N. Africa, W. Asia.

11. DRA'BA, *L.* WHITLOW-GRASS.

Herbs, usually small, perennial rarely annual, hoary with stellate down. *Leaves* entire; radical rosulate, cauline sessile or 0. *Flowers* small, racemose or corymbose, white or yellow. *Sepals* short, equal at the base. *Petals* shortly clawed, entire. *Pod* oblong, rarely linear, compressed; valves flattish, rarely ribbed; septum membranous; stigma simple. *Seeds* 2-seriate, compressed; funicles filiform; cotyledons accumbent.—DISTRIB. Temp. Arctic and mountain regions, chiefly of N. hemisphere, and Andes of S. America; a prominent feature in N. Polar regions; species 80, all very variable.—ETYM. δράβη, *acrid,* in allusion to the taste.

1. **D. aizoi'des,** *L.*; leaves rigid ciliate, scape leafless, petals yellow.

Walls and rocks, Pennard Castle and Worm's Head, Glamorgan; a native? *Watson;* fl. March–May.—Perennial, densely tufted. *Leaves* ⅛ in., rosulate, glabrous, shining, keeled, with white cartilaginous ciliate margins and tip. *Scape* 1–5 in., rigid. *Raceme* short, slightly lengthened after flowering. *Flowers* ⅛ in. diam. *Petals* hardly notched. *Pod* oblong, acute, glabrous; style half its length; cells 10–12-seeded.—DISTRIB. Sub-Alpine, Central and S. Europe, W. Asia.

2. **D. rupes'tris,** *Br.*; erect, small, leaves oblong-lanceolate hairy, scape-leaf 1 or 0, petals white, pod small straight oblong hairy, pedicel straight erecto-patent.

Alpine rocks, alt. 3–4,000 ft., rare and local; Ben Lawers, Cairngorm, Benhope; fl. July–Aug. — *Rootstock* slender. *Leaves* ⅛–⅓ in., ciliate, rarely toothed. *Scapes* one or more, 1–2 in., slender, flexuous; their leaf sessile, stellately pubescent. *Flowers* ⅛ in. diam., few, white. *Pod* ¼ in., oblong, obtuse; stigma subsessile. — DISTRIB. Arctic Europe, Siberia, Arctic America. — The Ingleborough plant, gathered by Sir Wm. Hooker, and referred to by Syme (Engl. Bot. 1. 103), is a small state of *D. incana.*

3. **D. inca'na,** *L.*; erect, stellately hispid, often branched, leaves oblong cauline amplexicaul, petals white, pod linear or oblong-lanceolate usually twisted, pedicel erecto-patent. *D. confu'sa,* Ehrh.

Alpine rocks, England, Wales, Scotland, ascending above 3,000 ft., mountains and maritime sandhills of S.W. Ireland; fl. June–July.—*Rootstock* often woody and long. *Stem* 6–14 in. *Radical leaves* short, ¾–1 in., densely rosulate, usually much toothed; cauline many, suberect. *Racemes* much elongated after flowering, many-flowered. *Flowers* as in *D. rupestris. Pods* ¼–½ in., variable in length breadth and twisting, glabrous or hairy, obtuse or subacute; stigma subsessile; pedicels short; seeds many.—DISTRIB. N. Europe (Arctic), Alps, N. Asia to the Himalaya; Alpine and Arctic America. —Very variable; small, unbranched specimens with few stem-leaves resemble *D. rupestris.*

4. **D. mura'lis,** *L.*; suberect or prostrate, stellate-hispid, slender, branched, stem-leaves broadly ovate or cordate obtuse coarsely toothed, petals minute white, pods linear-oblong horizontal, pedicels spreading.

Limestone rocks and walls in W. England from Westmoreland (ascending to 1,200 ft. in Yorkshire) to Somerset, introd. in Scotland and N.W. Ireland; fl. April–May.—*Rootstock* annual or biennial, slender. *Stem* 1–2 ft., flexuous. *Radical leaves* small, ½–1 in., obovate; cauline few, distant, broader. *Flowers* ⅛ in. diam. *Raceme* short, fruiting long. *Pods* ½ in., flat, obtuse, on pedicels longer than themselves; style 0; seeds 10–12, minute.—DISTRIB. Europe, temp. Asia to the Himalaya, N. Africa.

12. ERÓPH'ILA, *DC.* VERNAL WHITLOW-GRASS.

Small annual or biennial herbs. *Radical leaves* entire, spreading. *Scapes* slender, leafless. *Flowers* few, small, white. *Sepals* spreading, equal at the base. *Petals* obovate, 2-lobed or 2-partite. *Pod* oblong, compressed; valves 1-nerved, membranous, flat or convex; septum membranous. *Seeds* 2-seriate, very many and minute; funicle capillary; cotyledons accumbent.—

DISTRIB. Europe, W. Asia, and N. India; species 2–3.—ETYM. ἔαρ and φιλῶ from flowering in spring.—Usually combined with *Draba*, but as distinct as any genus in the Order.

1. **E. ver'na**, *L.*; leaves oblong-lanceolate coarsely toothed.

Abundant in its common form on walls, paths, &c.; fl. March–June.—Sub-glabrous or delicately pubescent herb, 1–6 in. *Leaves* ½–1 in., all radical, rosulate. *Scapes* slender, flexuous. *Flowers* ⅛–¼ in. diam. *Pods* ⅛–⅓ in., on spreading pedicels. — DISTRIB. Europe, temp. Asia to the Himalaya, N. Africa, N. America (perhaps introd.).—Seventy forms have been separated by M. Jordan as specific, and cultivated with more or less constancy of character.

Sub-sp. VER'NA proper; pod compressed, obovate-oblong twice or more as long as broad, cells 20–40-seeded.—Ascends to 1,200 ft. in Yorkshire.

Sub-sp. BRACHYCAR'PA, *Jordan* (sp.); pod compressed, orbicular-oblong 1–1½ as long as broad, cells 12–20-seeded.—Walls in Yorkshire, &c.

Sub-sp. INFLA'TA, *Watson*; pod turgid, ovoid-oblong twice as long as broad, cells 20–40-seeded.—Alpine rocks, Ben Lawers, alt. 2,500–3,000 ft.; fl. June–July. *D. verna β.* Hook.

12*. *ALYS'SUM*, *L.*

Herbs or small shrubs, often covered with stellate down. *Leaves* scattered or crowded, entire. *Flowers* small, white or yellow. *Sepals* short, equal. *Petals* short, entire or 2-fid. *Filaments* sometimes toothed or appendiculate. *Pod* short, very various in form; valves flat, concave or convex; septum entire or perforate; stigma simple. *Seeds* 2–10; cotyledons accumbent.—DISTRIB. N. and W. Asia and N. Africa; species 80–90. —ETYM. obscure.—A very polymorphous genus, almost every organ varying from the normal in one or other of the species; hence 10 genera have been made out of it.

A. CALYCI'NUM, *L.*; pubescent with appressed stellate hairs, leaves linear-spathulate, flowers yellow, pods suborbicular, sepals persistent.

Cultivated fields, rare and sporadic in England and Scotland, not indigenous; fl. June–Aug.—Annual, hoary. *Stem* woody and branched at the base; branches 3–8 in., rigid, ascending. *Leaves* ⅓–¾ in. long, few, scattered, obovate or oblong, obtuse. *Flowers* small; filaments with 2 teeth at the base. *Fruiting racemes* elongate. *Pods* ⅛ in. diam. very numerous, on short stiff spreading pedicels, nearly orbicular, turgid with broad thin flat margins, notched at the tip; style very short. *Seeds* 1–2 in each cell, narrowly winged.—DISTRIB. Central and S. Europe, W. Asia.

A. MARIT'IMUM, *L.*; pubescent with appressed 2-partite hairs, leaves linear, petals obovate white, pod obovoid-orbicular, sepals deciduous. *Kön'iga*, Br.; *Lobula'ria*, Desv.; *Gly'ce*, Lindl.

Waste places near the sea; a garden escape; fl. June–Sept.—Annual or perennial.—*Rootstock* prostrate. *Stem* 4–10 in., ascending, leafy. *Leaves* 1–1½ in., ⅛–⅛ in. broad, linear subacute. *Flowers* small, odorous; filaments all simple. *Pod* ⅛ in., without a border; pedicels slender, spreading; valves convex, 1-nerved; cells 1-seeded; style slender.—DISTRIB. Maritime S. Europe and W. Asia.

13. COCHLEA'RIA, *L.* SCURVY-GRASS.

Perennial herbs. *Leaves* entire or pinnate. *Flowers* small, white. *Sepals* short, equal, spreading. *Petals* shortly clawed. *Pod* sessile or shortly stalked, oblong or globose; valves turgid, reticulate; septum often imperfect; stigma simple or capitate. *Seeds* few or many, 2-seriate, not margined, tubercled. *Cotyledons* accumbent.—DISTRIB. Temp. and Arctic regions, chiefly littoral or Alpine; species 25.—ETYM. *cochlea*, from the form of the leaves.—The native British species form a very well defined group of variable littoral plants, confined to N.W. Europe and the Arctic regions; but there are exotic species with the habit of *Nasturtium.*

* *Valves with a dorsal nerve,*

1. **C. officina'lis,** *L.*; radical leaves cordate at the base, pod subglobose, valves reticulate, style very short. *C. polymorpha*, Syme.

Sea-shores and high mountains; fl. May–Aug.—*Stems* 4–10 in. glabrous, fleshy, many, ascending from the annual biennial or perennial rootstock. *Flowers* ¼–⅓ in. diam. *Pod* ⅛–¼ in. diam., cells 4–6-seeded.—DISTRIB. Arctic and sub-Arctic shores and Alps of W. Europe, N. Asia and N. America.—A valuable antiscorbutic.

Sub-sp. OFFICINA'LIS proper; radical leaves deeply cordate orbicular or reniform, cauline amplexicaul angled toothed or lobed, pod nearly globose.—Muddy sea-shores.

Sub-sp. ALPI'NA, *Watson;* radical and cauline leaves as in *officinalis*, pod rhomboid-oblong narrowed at both ends. *C. grænlan'dica*, Sm.—Mountains, ascending to near 4,000 ft.

Sub-sp. DAN'ICA, *L.* (sp.); radical leaves deltoid lobed cordate at the base, lower cauline similar petioled, upper amplexicaul also lobed, pod as in *alpina.*—Sandy and muddy shores, common in England, rarer in Scotland and Ireland.

2. **C. ang'lica,** *L.*; radical leaves oblong-rhomboid or ovate not cordate entire lobed or angled, cauline ½-amplexicaul, pod oblong or obovoid inflated much constricted at the suture, valves reticulate, style slender.

Muddy shores, in England, Wigton in Scotland, rare in Ireland; fl. May–July.—Much larger than any form of *C. officinalis*, with branches 10–18 in. *Leaves* more fleshy, narrower, and pod very different, almost ½ in., style longer.—DISTRIB. N. and W. Europe, Arctic and sub-Arctic Asia and America.

** *Valves with no dorsal nerve.* ARMORA'CIA, Rupp. (gen.).

C. ARMORA'CIA, *L.*; leaves linear-oblong obtuse deeply regularly crenate, radical long-petioled, cauline narrower sessile, racemes panicled, pods (immature) obovoid on long slender pedicels. *Horse-radish.*

Ditches, corners of fields, &c.; an alien or denizen (?) *Watson;* fl. May–June.—*Rootstock* stout, long, cylindric. *Leaves* 8–12 in., radical 3–5 in. broad, on petioles 1 ft., waved with many spreading reticulate nerves, cordate cuneate or unequal at the base; cauline many, 4–8 in., ½–1 in. broad, more serrate than toothed. *Flowers* ½ in. diam. *Pod* never ripening in this country; style slender; stigma large, capitate; seeds described as 8–12 in a cell, smooth.—DISTRIB. Origin unknown. I have not seen ripe pods; it is possibly a cultivated form of *C. macrocarpa*, W. and K., a native of Hungary.

13*. *CAMELI'NA*, *Crantz.* GOLD OF PLEASURE.

Annual, erect herbs. *Leaves* almost entire, cauline auricled. *Flowers* small, yellow. *Sepals* short, equal at the base. *Petals* obovate. *Pod* obovoid; valves turgid, keeled at the base, produced upwards along the base of the style; margins flattish; septum membranous; stigma simple. *Seeds* many, 2-seriate, not margined; funicle slender, adnate at the base to the septum; cotyledons incumbent.—DISTRIB. Europe and temp. Asia; species 5–10 (all vars. of one?).—ETYM. χαμαί and λίνον, *dwarf flax.*

C. SATI'VA, *L.*; radical leaves petioled, cauline oblong-lanceolate.

Flax-fields, sporadic, not even naturalized; fl. June–July.—*Stems* 2–3 ft., branched above, slender. *Radical leaves* soon withering; cauline 1–3 in., obtuse; auricles pointed, entire or lobulate. *Flowers* ⅛ in. diam. *Petals* erect, spathulate. *Pods* ¼–⅓ in., on slender spreading peduncles, obovoid, margins flat, thin; seeds few, oblong, punctulate.—DISTRIB. Central and S. Europe, and temp. Asia.—Seeds used for soap-makers' oil, for feeding poultry, and making oil-cake.

14. SUBULA'RIA, *L.* AWL-WORT.

A small submerged perennial scapigerous herb. *Radical leaves* all subulate. *Flowers* small, white. *Sepals* spreading, equal. *Petals* small. *Pod* shortly stalked, oblong or nearly globose; valves convex, ribbed; septum membranous; stigma sessile, entire. *Seeds* few, 2-seriate; cotyledons incumbent, incurved, narrowed into the radicle; the lengthened bases of the cotyledons being turned up, a transverse section of the embryo shows a radicle with apparently 4 cotyledons.—DISTRIB. Arctic, N. and Central Europe, N. Asia, Iceland, N.E. U. States.—ETYM. *subula*, from the form of the leaves.

1. **S. aquat'ica,** *L.*; leaves cellular, scape naked few-flowered.

Gravelly bottoms of subalpine lakes in Scotland, ascending to 2,200 ft.; Wales, and Ireland; fl. June–Aug.—*Roots* of densely tufted glabrous matted white fibres from a small stock. *Leaves* 1–3 in., fascicled, terete, gradually tapering upwards. *Scapes* 1–3 in. *Flowers* ⅛ in. diam., submerged. *Pods* small, ⅛ in.; pedicel short, ascending; seeds pale brown, punctulate.

15. CAPSEL'LA, *Mœnch.* SHEPHERD'S PURSE.

Annual herbs. *Radical leaves* entire or lobed. *Flowers* small, white, pedicels slender. *Sepals* spreading, equal. *Pod* much laterally compressed, oblong or obcuneate or obcordate; valves boat-shaped, keeled; septum membranous; stigma sessile. *Seeds* many, minute; cotyledons incumbent. —DISTRIB. N. temp. regions; species 6.—ETYM. Diminutive of *Capsula.* —*Petals* tend to be transformed into stamens.

1. **C. Bur'sa-Pastor'is,** *DC.*; pod triangular or obcordate.

A weed in all situations, ascending to 1,200 ft.; fl. March–Nov.—Glabrous or hairy, hairs branched. *Roots* long, tapering. *Stems* 6–16 in., branched. *Leaves* rosulate, pinnatifid, rarely entire, upper lobe triangular, cauline auricled. *Flowers* ⅛ in. diam. *Pods* ¼–⅓ in.; pedicels slender; style short; valves smooth; seeds many, oblong, punctate.—DISTRIB. Temp and Arctic Europe, N. Africa and Asia to the Himalaya; introd. in all temp. climates.

16. SENEBIE'RA, *DC.* WART-CRESS.

Annual or biennial, branched, prostrate herbs. *Leaves* entire or cut. *Flowers* minute, white, in short leaf-opposed racemes. *Sepals* short, spreading. *Stamens* 2, 4, or 6. *Pod* small, indehiscent, didymous, laterally compressed; valves subglobose, rugose or crested; stigma sessile. *Seeds* 1 in each cell; cotyledons incumbent or induplicate, gradually narrowed into the radicle.—DISTRIB. Temp. and warm regions; species 6.—ETYM. *J. Senebier*, a Genevese vegetable physiologist.—Rapidly spreading weeds in the colonies, &c. The shorter stamens are sometimes absent. Embryo in some species cyclical.

1. **S. Corono'pus,** *Poiret;* lobes of fruit not separating deeply wrinkled, the wrinkles forming a crest, style subulate. *Corono'pus Ruel'lii,* Gaertner.

Waste ground, from Fife southward, rare in Scotland, local in Ireland; fl. June–Sept.—Habit, &c. of *S. didyma,* but glabrous, less branched; foliage larger, less divided; petals and stamens usually perfect; pods twice the size, abruptly narrowed into the subulate style, lobes connate; pedicels very short, thick; and seeds twice as large. Surface of pod variable as to sculpturing.—DISTRIB. Europe, N. Africa, W. Asia; introd. in the U. States.

S. DID'YMA, *Persoon;* lobes of fruit separating wrinkled, style minute. *Corono'pus,* Sm.

Waste ground near the sea from Hampshire westward, S. and W. Wales, S. and W. Ireland; sporadic elsewhere; a denizen, *Watson;* fl. July–Sept.—Annual or biennial, slightly hairy, diffuse, creeping, branched and leafy. *Leaves* finely cut, 1–2-pinnatifid; lobes small, obovate, spreading. *Flowers* in short racemes, very minute, white, usually apetalous and diandrous. *Pod* ⅛ in. broad, pedicels spreading; separating into 2 indehiscent hard lobes; seed reniform, punctate-striate.—DISTRIB. Believed to be a native of the S. States of S. America; now introd. in many countries.

17. LEPID'IUM. CRESS.

Herbs sometimes shrubby at the base, various in habit. *Leaves* entire or much divided. *Flowers* small, white, often apetalous and oligandrous. *Sepals* short, equal. *Petals* short or 0. *Stamens* 2, 4, or 6. *Pod* oblong ovate obovate or obcordate, much laterally compressed; valves keeled, winged or not; septum narrow; stigma notched. *Seeds* 1 in each cell, rarely 2, pendulous from the septum; cotyledons incumbent, rarely accumbent.—DISTRIB. Temp. and warmer regions of the globe; species 60–80.—ETYM. λεπίδιον, from the *scale*-like form of the pods.—Stamens sometimes deformed. Cotyledons 3-partite in the common Cress.

SECTION 1. **Nasturtias'trum,** *Gren.* and *Godr. Pod* much compressed, entire or notched, valves keeled, not winged; style minute.

1. **L. latifo'lium,** *L.*; perennial, erect, radical leaves long-petioled oblong serrate, pod ovoid entire. *Dittander.*

Salt marshes, indigenous in S. Wales, Somerset, Kent, Hampshire, Essex, and Norfolk; introd. in Fife and Berwick; S. of Ireland; fl. July–Aug.—Glabrous, rather glaucous. *Rootstock* elongate, stoloniferous. *Stem* 2–4 ft., much branched, leafy. *Radical leaves* often 1 ft.; cauline narrower, upper sessile. *Flowers* minute, in short densely panicled bracteate corymbs. *Pod* ⅛ in.; pedicels short; valves not winged.—DISTRIB. Mid. and S. Europe, W. Asia.

2. **L. rudera'le,** *L.*; annual, erect or prostrate, lower leaves 2-pinnatifid, pod orbicular-oblong notched.

Waste places near the sea, E. and S. of England, rarer and probably not indigenous elsewhere; a denizen? *Watson;* fl. May–June.—Glabrous or slightly pubescent. *Radical leaves* much divided, segments narrow; upper cauline linear, entire. *Flowers* minute, usually apetalous and diandrous, in terminal and lateral corymbs. *Pods* ⅛–½ in., flat; pedicels slender, diverging; valves keeled, almost winged at the top; seeds compressed.—DISTRIB. Europe, N.W. Asia to the Himalaya; introd. in U. States.

SECTION 2. **Le'pia,** *DC.* *Pod* ovoid or oblong, much compressed, notched; valves broadly winged; style short.

3. **L. campes'tre,** *Br.*; cauline leaves auricled toothed, anthers yellow, pods concave papillose, style not longer than the notch. *Pepperwort.*

Fields and roadsides, from Lanark and Elgin southwards, rare in Scotland and Ireland; fl. May–Aug.—Glabrous or pubescent, annual or biennial. *Stem* 6–18 in., erect, simple or branched. *Radical leaves* pinnatifid or entire, cauline oblong-lanceolate. *Flowers* ⅛ in. diam. *Pods* ¼ in., in horizontal racemes, broadly ovate, shorter than the spreading pedicels; papillæ scale-like when dry; seeds oblong, curved.—DISTRIB. Europe, N. Africa, N. and W. Asia to India; introd. in U. States.

4. **L. Smith'ii,** *Hook.*; cauline leaves auricled toothed, anthers violet, pods concave slightly papillose, style longer than the notch. *L. hirtum,* Sm. in part.

Fields and roadsides, from Moray southwards, rare in Scotland, ascending to 1,000 ft., and in Ireland; fl. April–Aug.—Habit of *L. campestre* but perennial, more downy, with a large style and less papillose pod, probably a form of *L. hirtum,* L.—DISTRIB. W. Europe.

SECTION 3. **Carda'ria,** *DC.* *Pod* deltoid-cordate, constricted between the valves; valves hardly keeled, not winged; style distinct.

L. DRA'BA, *L.*; stem flexuous leafy, leaves oblong amplexicaul toothed.

Fields, hedgebanks, and railway cuttings, rare and sporadic in Mid. and S. England, but hardly naturalized; an alien, *Watson;* fl. May–June.—Perennial, hoary or downy. *Stem* 1–3 ft., branched above. *Leaves* 1–3 in., auricles converging, lower petioled. *Racemes* in branched panicles. *Flowers* ¼ in. diam., white. *Pod* ⅛ in. broad, deltoid with rounded angles, on slender spreading pedicels, disposed in short racemes; valves slightly papillose, one often smaller or imperfect, enclosing the seed when dehiscing.—DISTRIB. Central and S. Europe, W. Asia; introd. in U. States.

18. THLAS'PI, *L.* PENNY CRESS.

Annual or perennial, glabrous, often glaucous herbs. *Leaves* quite entire or toothed, radical rosulate, cauline hastate. *Flowers* white or rose-coloured. *Sepals* erect, equal at the base. *Petals* obovate. *Pod* short, laterally compressed, broader upwards, emarginate; valves keeled or winged. *Seeds* few, not margined; cotyledons accumbent.—DISTRIB. Temp., Alpine, and Arctic N. hemisphere, rare in South; species 30.—ETYM. The old Greek name of the genus.

1. **T. arven'se,** *L.*; annual, cauline leaves sagittate sinuate-toothed, pod large orbicular deeply notched, valves broadly winged all round, cells 5–8 seeded. *Mithridate Mustard.*

Fields, &c. rather common; rarer in Scotland; east of Ireland; a colonist, *Watson;* fl. May–July.—Stem 1–2 ft., usually simple, slender, erect. *Radical leaves* petioled, cauline with prominent auricles. *Flowers* ¼ in. diam., white. *Pods* ½–¾ in. diam., flat, on slender spreading pedicels, disposed in long racemes. *Wings* with a delicate marginal nerve, lobes sometimes overlapping at the tip; style very short; seeds dark, oblong, ridged and punctate.—DISTRIB. Europe to N. Africa, N. and W. Asia to N.W. India; introd. in U. States.

2. **T. perfolia'tum,** *L.*; annual, cauline leaves cordate with converging auricles, pod small obcordate, valves winged above, cells 4–6 seeded.

Limestone pastures, rare; Oxford and Gloucestershire; fl. April–May.—Much branched from the base; branches 4–6 in., ascending, flexuous. *Leaves* ½–1 in. broad; radical spathulate, petioled. *Flowers* ⅛ in. diam., white. *Pods* ⅛ in., and pedicels horizontal; valves turgid, wings short with a stout marginal nerve; style very short; seeds pale.—DISTRIB. Mid. and S. Europe, N. Africa, N. and W. Asia.

3. **T. alpes'tre,** *L.*; perennial or biennial, cauline leaves sagittate, pods obcordate retuse, valves winged above, cells 4–8-seeded.

Mountain districts, England and Scotland, ascending to 2,500 ft. in Forfarshire; fl. June–Aug.—*Stem* 6–10 in. *Radical leaves* long-petioled, obovate, entire; cauline ½ in. *Flower* ⅛ in. diam. *Racemes* of pods variable. *Pod* ¼ in., curved upwards, on spreading pedicels, longer than in the preceding species, and more narrowed at the base; wing with an obscure marginal nerve; seeds red-brown.—DISTRIB. Europe, Himalaya.—I do not find that authentically named specimens of the following sub-species altogether tally with the characters assigned to them.

Sub-sp. SYLVES'TRE, *Jord.* (sp.); notch of pod shallow, style as long as its lobes.—Teesdale, Allen river, Northumberland; Glen Isla, Scotland.

Sub-sp. OCCITA'NUM, *Jord.* (sp.); notch of pod shallow, style slender longer than its lobes, radicle at times incumbent (Syme).—Limestone rocks, Settle, Yorkshire and Llanrwst, N. Wales.

Sub-sp. VI'RENS, *Jord.* (sp.); notch of pod minute, style slender much exceeding it.—Limestone rocks, Matlock.

19. IBE'RIS, *L.* CANDY-TUFT.

Low, glabrous, branched, leafy herbs, often shrubby below. *Leaves* entire or pinnatifid, often fleshy. *Flowers* corymbose, all or the outer only with the 2 outer petals radiating. *Sepals* equal at the base. *Petals* white or lilac, the two outer much the longest. *Filaments* without appendages. *Pod* broad, much compressed, orbicular or ovate, tip entire or notched; valves keeled or winged; septum very narrow, of two lamellæ; stigma notched. *Seeds* 1 in each cell, not margined; cotyledons accumbent; radicle horizontal or ascending.—DISTRIB. Mid. and S. Europe, Asia Minor; species about 20.—ETYM. Iberia (Spain), where many species grow.

1. **I. ama'ra,** *L.*; leaves oblong-lanceolate, pods suborbicular.

Cornfields and cultivated ground on a dry soil, chiefly in the centre and E. of England, rare in Scotland; a colonist, *Watson;* fl. July–Aug.—Annual. *Stem* 6–9 in., erect, corymbosely branched, ribbed, the ribs minutely downy. *Leaves* 1–3 in., sessile, scattered, sparingly toothed or pinnatifid, often minutely ciliate. *Flowers* ¼–½ in. diam., white or purplish. *Pods* ⅓ in. broad, flat, on

short horizontal pedicels, in short racemes; notch triangular; valves narrowly winged, wings acute above; style exceeding the wings.—DISTRIB. W. Europe, from Belgium southwards.—Very bitter.

20. TEESDA'LIA, *Br.*

Small, annual, glabrous, scapigerous herbs. *Leaves* rosulate, pinnatifid: *Flowers* minute, white. *Sepals* spreading, equal at the base. *Petals* equal, or 2 outer larger. *Stamens* 4 or 6, with a scale at the base of each filament. *Pod* broadly obovate or orbicular, emarginate or 2-lobed; valves boat-shaped, slightly winged; cells 2-seeded; stigma simple. *Cotyledons* accumbent. —DISTRIB. S. and W. Europe and W. Asia; species 2.—ETYM. Robert Teesdale, a Yorkshire botanist.

1. **T. nudicau'lis,** *Br.*; two outer petals twice as long as the others.

Sandy and gravelly places, not rare in England, ascending to near 1,000 ft. in Yorkshire, very local in Scotland, Moray, Aberdeen, Glasgow; absent from Ireland; fl. April–June.—*Stems* 4–18 in., usually many, slender, ascending. *Radical leaves* 1–2 in., numerous, lobes broad, spreading. *Flowers* ⅛ in. diam. *Pods* ⅛ in., in racemes 2–9 in., pedicels short slender spreading; style very short.—DISTRIB. Europe, N. Africa, W. Asia.

21. HUTCHIN'SIA, *Br.*

A small annual herb. *Leaves* rosulate, pinnatifid. *Flowers* minute, corymbose. *Sepals* short, equal at the base. *Petals* small, equal. *Filaments* without scales at the base. *Pod* broadly oblong, obtuse, much compressed; valves keeled; septum narrow; stigma sessile. *Seeds* 2 in each cell, compressed, not margined; funicle slender; cotyledons accumbent.—DISTRIB. Europe, N. Africa, W. Asia to N. W. India.—ETYM. Miss Hutchins, a zealous Irish botanist.

1. **H. petræ'a,** *Br.*; sepals about equalling the petals.

Limestone rocks W. of England and Wales, from Yorkshire (ascending to to 1,500 ft.) to Somerset; naturalized on the walls of Eltham churchyard, (where it was planted by Dillenius?) and of the Mathew cemetery, Cork; fl. March–May.—Glabrous or sparingly hairy, slender, much branched from the base, 2–5 in. *Radical leaves* ½–1 in., lobes spreading, obovate, almost petioled; cauline shorter, pinnatifid. *Pods* ⅛–½ in., on horizontal pedicels, in a short raceme; style distinct; seeds pale.

21*. *ISA'TIS, L.* WOAD.

Tall, erect, annual or biennial branched herbs. *Cauline leaves* sagittate. *Flowers* yellow, on slender pedicels deflexed in fruit. *Sepals* equal at the base. *Petals* equal. *Pod* indehiscent, 1-celled, oblong ovate or orbicular, thickened in the middle; wing or margin very broad; stigma sessile. *Seed* pendulous from the top of the cell; cotyledons incumbent.—DISTRIB. Temp. Europe, Asia, and N. Africa; species 25–30.—ETYM. The Greek name of the genus.

1. I. TINCTO'RIA, *L.*; pod obovate-oblong, wing broad and thick.

Sporadic; cultivated fields and chalk-pits; naturalized near Guildford; an alien, *Watson;* fl. July–Aug.—Glaucous, glabrous or nearly so. *Stem* 1–3 ft., stout, erect, branched above. *Radical leaves* oblong-obovate or lanceolate;

petioles long; cauline 3–5 in., sessile. *Flowers* ½ in. diam., in crowded panicled corymbs. *Pods* ½ in., in short racemes, pendulous, glabrous, brown when ripe, rounded at the tip; wing hard; stigma sessile in a minute notch; seed linear-oblong.—DISTRIB. Europe, N. Asia.—The Ancient Britons stained themselves with this plant; later, the Saxons imported it; it is still cultivated in Lincolnshire.

22. CRAM'BE, *L.* SEA-KALE.

Perennial herbs with stout branched stems. *Leaves* usually broad. *Flowers* white, in long panicled racemes. *Sepals* spreading, equal. *Longer filaments* often with a tooth on the outside. *Pod* indehiscent, 2-jointed, lower joint slender, seedless, forming a pedicel to the upper, which is globose 1-celled and 1-seeded; stigma sessile. *Seed* globose, pendulous from a basal funicle; cotyledons incumbent, conduplicate.—DISTRIB. Europe and W. Asia; species 16.—ETYM. The Greek name of the plant.

1. **C. marit'ima,** *L.*; leaves broad waved toothed or pinnatifid.

Sandy and shingly sea-coasts, rare, from Fife and Isla southwards; very rare in Ireland; fl. June–Aug.—*Rootstock* as thick as the thumb, fleshy, burrowing; branches 1–2 ft., spreading. *Leaves* 6–10 in., fleshy, petiolate, broadly ovate-cordate oblong or orbicular, glabrous and glaucous; upper few and small. *Corymbs* in large much-branched panicles. *Flowers* ¼ in. diam., white; shorter filaments toothed near the tip externally. *Pods* ¾ in., on slender ascending pedicels 1 in.—DISTRIB. Coasts of Europe, from Finland to the Bay of Biscay and the Black Sea.—Formerly eaten wild, cultivated for about 200 years in England, whence it was introduced to the Continent.

23. CAKI'LE, *Gærtn.* SEA ROCKET.

Annual, large, fleshy, branched herbs. *Leaves* entire or pinnatifid. *Flowers* white or purplish. *Lateral sepals* gibbous at the base. *Pod* indehiscent, of 2 angular 1-celled joints; upper joint deciduous, compressed, with 1 basal seed; lower cuneate, 2-edged, with 1 pendulous seed; stigma sessile. *Cotyledons* accumbent, sometimes oblique.—DISTRIB. Seashores of Europe and N. America; species 2.—ETYM. An Arabic word.

1. **C. marit'ima,** *L.*; suberect or decumbent, leaves entire or lobed.

Sandy and shingly shores, abundant; fl. June–July.—Annual; rather succulent; branches 1–2 ft., zigzag, ascending. *Leaves* 2–3 in., fleshy. *Flowers* ½ in. diam., corymbose, lilac or white; pedicels stout. *Pods* on short thick pedicels in lax racemes, ribbed when dry; lower joint ½ in., broadish upwards; upper ¾ in., base truncate.—DISTRIB. Europe, N. Africa, Iceland. —*C. america'na,* which appears to me identical with this, is found on the shores of the Canadian Lakes, as well as on the American sea-coasts, south to the W. Indies.

24. RAPH'ANUS, *L.* RADISH.

Annual or biennial herbs. *Radical leaves* lyrate. *Flowers* in long racemes, white or yellow, purple-veined. *Sepals* erect, lateral saccate at the base. *Pod* elongate, indehiscent, or separating into 1-seeded joints, terete or moniliform, coriaceous or corky, with several superimposed 1-seeded cellules; style or beak of the pod slender; stigma notched. *Seeds* pendulous, globose; cotyledons conduplicate or much folded.—

DISTRIB. Europe and temp. Asia; species 6.—ETYM. ῥά and φαίνω, in allusion to its rapid growth.

1. **R. Raphanis'trum,** *L.*; leaf-segments usually few and remote, pod subulate not much constricted at the 4–8 joints faintly ribbed, beak as long as the 2 or 3 last joints. *Wild Radish* or *White Charlock.*

Cornfields; ascends to 1,000 feet; a colonist, *Watson;* fl. May–Sept.—Annual, stout, 1–2 ft., erect or spreading, hairy or hispid. *Leaves* 4–10 in., coarsely toothed or serrate, terminal lobe largest. *Flowers* ¾ in. diam., white or straw-coloured. *Pods* 1–3 in., dehiscing at the base above the first seedless segment, which is very small; beak ½–¾ in., subulate, flattened. —DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to India; introd. in America.— This, the origin of the garden radish, is probably a form of the next species.

2. **R. marit'imus,** *L.*; leaf-segments many approximate horizontal or reversed, alternate often smaller, pod of 2–4 joints separated by a very deep constriction strongly ribbed when dry, beak slender subulate.

Sandy and rocky shores from the Clyde southwards, and in Ireland; fl. July–Aug.—Very near *R. Raphanistrum* and perhaps the wild form of that plant, but biennial, more hispid; leaves with more numerous and closer set lobes; flowers smaller, darker yellow, rarely white; pod with fewer joints, deeper intervals between them, stronger ribs and a beak as long as the upper joint. —DISTRIB. W. Europe, from Holland to Spain.

ORDER VII. RESEDA'CEÆ.

Annual or perennial herbs, rarely shrubs. *Leaves* alternate, simple or pinnatisect; stipules 0, or minute and glandular. *Flowers* racemed or spiked, bracteate. *Calyx* persistent, 4–7-partite, often irregular, imbricate in bud. *Petals* 4–7, hypogynous, entire or lobed, equal or the posticous larger, open in bud. *Disk* hypogynous, conspicuous. *Stamens* usually many, inserted on the disk, equal or unequal, free or connate. *Ovary* of 2–6 connate carpels, lobed at the top, open between the stigmatiferous lobes; ovules usually many, on 2–6 parietal placentas, amphitropous or campylotropous. *Fruit* usually a coriaceous capsule, open at the top. *Seeds* many, reniform, exalbuminous; embryo curved or folded; cotyledons incumbent. —DISTRIB. Europe, W. Asia, N. and S. Africa; genera 6; species 20. —AFFINITIES. Too closely allied to *Capparideæ.*—PROPERTIES. *Reseda Luteola* yields "Weld," a yellow dye; others are considered acrid.

1. RES'EDA, *L.* MIGNONETTE.

Herbs. *Leaves* entire lobed or pinnatifid; stipules glandular. *Flowers* racemed. *Calyx* irregular. *Petals* unequal, 2-multifid, the posticous with a membranous appendage on its face. *Disk* broad dilated behind. *Stamens* 10–40. *Ovary* sessile or stalked. — DISTRIB. Europe and W. Asia; species 26.—ETYM. *resedo,* in allusion to supposed sedative properties.

1. **R. Lute'ola,** *L.*; leaves linear-lanceolate undivided, sepals 4, stigmas 3. *Dyer's weed, Weld.*

Waste places, especially on clay or chalk soils; doubtfully native in Scotland; common in Ireland; fl. June–Aug.—Glabrous, 2–3 ft., annual or biennial, branched. *Racemes* long, spike-like. *Flowers* yellow. *Petals* 3–5, if 5 upper 3–4-cleft, two lateral 3-cleft, two lower entire. *Disk* large, crenate. *Stamens* 20–24. *Capsule* depressed, 3-lobed. *Seeds* subglobose, black. — DISTRIB. Europe, N. Africa, W. Asia; introd. in U. States.

2. **R. lu'tea,** *L.*; leaves 2–3-fid or pinnate or bipinnatifid, lobes few distant linear obtuse, sepals and petals 6 very unequal, stigmas usually 3.

Waste places, from Dumfries and Haddington southwards, very rare in Ireland, and perhaps introduced; fl. June–Aug. — Biennial. *Stem* 1–2 ft., branched, ribbed, papillose. *Leaves* very various in lobing. *Racemes* dense-flowered, conical; flowers pale yellow. *Sepals* linear, upper smaller. *Upper petals* with a 2-lobed claw and 3-fid limb, lateral 2-fid, lower entire. *Stamens* 16–20, deflexed. *Capsule* ½–¾ in., oblong, 3-toothed. *Seeds* obovoid, black. —DISTRIB. Europe, N. Africa, W. Asia.

R. AL'BA, *L.*; leaves pinnate undulate glaucous, sepals 5–6, petals 5–6 all 3-fid, stigmas usually 4. *R. suffruticulo'sa,* L., and *R. fruticulo'sa,* L.

Waste places, chiefly near the sea, an outcast, naturalized only; fl. June–Aug.—I follow Bentham in taking the name of *alba* for this, which most authors agree in considering the same with *fruticulosa* and *suffruticulosa. Flowers* white. *Stamens* 12–14. *Seeds* reniform, rough.—DISTRIB. S. Europe and N. Africa.—The true *R. alba* is more often 6-merous than is *fruticulosa.*

ORDER VIII. CISTI'NEÆ.

Herbs or shrubs. *Leaves* opposite, entire; stipules foliaceous, small, or 0. *Flowers* terminal and solitary, or in racemes (scorpioid cymes). *Sepals* 3–5, imbricate, 2 outer (bracts of some) small or 0; 3 inner often convolute in bud. *Petals* 5, rarely 3 or 0, fugacious, convolute in bud. *Stamens* many, rarely few, hypogynous, free. *Ovary* 1-celled, or divided by parietal septa; style simple, stigmas 3; ovules 2 or more, on parietal placentas, orthotropous, funicles slender. *Capsule* 3–5-valved; valves placentiferous. *Seeds* with mealy or firm albumen, testa crustaceous often mucilaginous; embryo usually curved and excentric.—DISTRIB. Europe, N. Africa and W. Asia; rare in N. America; genera 4; species 60.—AFFINITIES. With *Bixineæ* and *Capparideæ.* — PROPERTIES. A resinous balsam (Ladanum) is yielded by *Cisti.*

1. HELIAN'THEMUM, *Tourn.* ROCK-ROSE.

Herbs or under shrubs. *Petals* 5. *Stamens* many, rarely few. *Ovary* many-ovuled, style jointed at the base, stigma capitate or 3-lobed. *Embryo* hooked, folded or circumflex.—DISTRIB. Europe, W. Asia and N. America; species about 30.—ETYM. ἥλιος and ἄνθεμον, *sun-flower.*—Various species are dimorphic, some flowers having no petals and few stamens.

SECTION 1. **Helian'themum** proper. *Style* elongate, bent upwards. *Funicle* thickened. *Embryo* with the radicle bent upwards parallel to the cotyledons.

1. **H. vulga're,** *Gærtn.*; shrubby, leaves opposite stipulate, margins

flat hairy above downy below, pedicels bracteate. *H. surreja'num*, Eng. Bot. (a garden variety); *Cis'tus tomento'sus*, Sm.

Dry soils, abundant, except in the W. of Scotland and Cornwall, ascending to 2,000 ft., absent from Ireland; fl. July–Sept.—*Branches* 3–10 in., procumbent. *Leaves* oblong, variable. *Flowers* ¾–1¼ in. diam., yellow; bracts narrow. *Sepals* subglabrous, inner apiculate.—DISTRIB. Europe (Arctic), N. Africa, W. Asia.

2. **H. polifo'lium,** *Pers.*; shrubby, leaves opposite hoary and downy on both surfaces stipulate, margins recurved, pedicels bracteate.

Stony places, very rare, Brean Downs Somerset, Babbicombe and Torquay; fl. July–Aug.—Habit of *H. vulgare*, but more shrubby, leaves with recurved and even revolute margins, and flowers white. *Sepals* tomentose, inner obtuse. —DISTRIB. Mid. and S. Europe, N. Africa.

SECTION 2. **Tubera'ria.** *Style* straight or 0. *Funicle* thickened. *Embryo* annular.

3. **H. gutta'tum,** *Miller*; annual, hoary and hairy, erect, lower leaves opposite exstipulate, upper alternate stipulate.

Dry hilly downs in Wales, S. Ireland, and the Channel Is.; fl. June–Aug. —*Stem* 6–12 in., 2–3-chotomously branched. *Leaves* 1–2 in., linear- or obovate- or oblong-lanceolate. *Flowers* ½–¾ in. diam., in unilateral cymes, yellow with a red spot at the base of the cuneate petals. *Capsule* smooth.—DISTRIB. Europe, N. Africa, W. Asia.

Sub-sp. GUTTA'TUM proper; pedicels ebracteate.—Cork, Jersey, Alderney.

Sub-sp. BREWE'RI, *Planchon* (sp.); pedicels bracteate. — Holyhead and Anglesea.

SECTION 3. **Pseudo-cis'tus.** *Style* sigmoid. *Funicle* not thickened. *Embryo* sigmoid.

4. **H. ca'num,** *Dunal*; shrubby, hoary, leaves opposite exstipulate, pedicels usually bracteate. *Cis'tus mar'ifolius*, and *C. anglicus*, *L.*

Dry banks, rocks, &c. in W. England, from Westmoreland to Glamorgan, and in Teesdale, ascending to 1,800 ft.; W. Ireland, Arran Is.; fl. May–July. —Woody, procumbent, much branched, 6–8 in. *Leaves* ¼–¾ in., ovate or oblong. *Flowers* ¼–¾ in. diam., few, yellow.—DISTRIB. Europe, N. Africa and W. Asia.

VAR. 1, *ca'num* proper; leaves hoary on both surfaces, and hairy above, sepals pubescent and having spreading hairs.—VAR. 2, *vinea'le*, Pers. (sp.); leaves hoary beneath, nearly glabrous above, sepals hoary and shortly hairy on the edges ribs and margins.

ORDER IX. VIOLA'CEÆ.

Herbs or shrubs. *Leaves* alternate, entire or pinnatisect, margins involute in vernation; stipules generally persistent. *Flowers* axillary, regular or irregular, solitary or cymose, 2-bracteolate. *Sepals* 5, persistent, equal or unequal, imbricate in bud. *Petals* 5, equal or unequal, hypogynous, imbricate or contorted in bud. *Stamens* 5, filaments short, broad; anthers free or connate by the broad connective, which is produced beyond the cells. *Ovary* sessile, 1-celled; style simple, stigma entire cup-shaped or lobed;

ovules many on 3 parietal placentas, anatropous. *Fruit* a 3-valved capsule rarely a berry, many-seeded. *Seeds* small, funicle short, albumen fleshy; embryo straight, cotyledons flat.—DISTRIB. Temp. and trop. regions; genera 21, species 240.—AFFINITIES with *Bixineæ*, *Passifloreæ*, and *Frankeniaceæ*.—PROPERTIES. Emetic and laxative.

1. VI'OLA, *L.* VIOLET, PANSY, HEARTSEASE.

Low herbs, rarely shrubs. *Leaves* radical or alternate. *Flowers* on 1- rarely 2-flowered peduncles. *Sepals* sub-equal, produced at the base. *Petals* erect or spreading; lower largest, spurred or saccate at the base. *Anthers* connate, connectives of the 2 lower stamens often spurred at the base. *Style* swollen above, straight or oblique at the tip, stigma obtuse or cup-shaped. *Capsule* 3-valved; valves elastic. *Seeds* ovoid or globose. —DISTRIB. All temp. regions; species 100.—ETYM. The old Latin name. —Flowers often dimorphic, the large-petalled flowering early and often yielding no seed; the small-petalled or apetalous flower late, and are very prolific.

SECTION I. **Nomim'ium.** *Upper petals* directed forwards. *Stigma* obliquely beaked.—Apetalous autumnal flowers chiefly fertile. *Stipules* not leafy.

* *Stem very short. Leaves enlarging after flowering. Sepals obtuse.*

1. **V. palus'tris,** *L.*; glabrous, rootstock subterranean creeping, leaves reniform-cordate, style straight, stigma obliquely truncate, fruiting peduncles erect.

Swamps and bogs, ascending to 4,000 ft. in the Highlands, rarer in the south of England; fl. April–July.—*Rootstock* white, scaly; runners short, leafless. *Leaves* slightly crenate; stipules glandular. *Flowers* ½ in. diam., white or lilac, scentless; spur short, obtuse. *Lateral petals* almost glabrous. *Anther spurs* short.—DISTRIB. Temp. Arctic and sub-Arctic Europe, Asia, and America.

2. **V. odora'ta,** *L.*; slightly hairy or downy, runners very long, leaves broadly cordate, spur nearly straight, style hooked, stigma oblique. *Sweet Violet.*

Hedgebanks and copses, wild in E. and S.E. England, naturalized elsewhere, perhaps native of E. Ireland; fl. March–May.—*Rootstock* short, scarred. *Leaves* deeply cordate at the base, sinus closed; stipules glandular. *Bracts* at or about the middle of the peduncle. *Flowers* fragrant, blue, white, or red-purple; lateral petals with or without a tuft of hairs; spur short, obtuse. *Anther spurs* linear-oblong. *Capsule* pubescent, pedicels decurved.—DISTRIB. Europe, N. Africa, N. and W. Asia to the Himalaya.

3. **V. hir'ta,** *L.*; pubescent, rootstock very short, runners short or 0, leaves subtriangular-cordate, spur hooked, style hooked, stigma oblique.

Dry soils, local, chiefly in the E. counties from Forfar southwards, ascending to near 1,000 ft. in Yorkshire; fl. April–June.—Very near *V. odorata*, and perhaps a variety of it, but more tufted and hairy, leaves narrower and more triangular, with deeper crenatures and a shallower sinus; bracts lower on the peduncle; spur long and hooked; flowers inodorous or faintly scented. —DISTRIB. Europe, N. and W. Asia to N.W. India.

VAR. 1, *calca'rea*, Bab.; petals narrow. Gogmagog Hills.—VAR. 2, *sepin'cola*,

Jord. (sp.); more hairy, with longer runners (possibly a hybrid of *hirta* with *odorata*). Yorkshire.

** *Stem evident. Leaves not enlarging after flowering. Sepals acute or acuminate.*

4. **V. cani'na,** *L.*; perennial, leaves long-petioled ovate-cordate or oblong-lanceolate, stipules small narrow, toothed and ciliate, style hooked, stigma acute, fruiting peduncles erect. *Dog-violet.*

Woods, pastures, and banks; fl. April–Aug.—Very variable in size, habit, and colour of flower, glabrous or nearly so. *Leaves* crenate-serrate, varying in the sub-species from broadly ovate and deeply cordate ¾ in., to oblong-lanceolate and 3 in.; stipules subulate linear or lanceolate. Bracts at or above the middle of the peduncle, subulate or lanceolate, toothed or serrate. *Flower* ½–1¼ in. diam., blue, lilac, grey or white. *Sepals* narrow, acuminate. *Capsule* oblong, 3-gonous.—DISTRIB. Europe (Arctic), N. and W. Asia to the Himalaya, N. Africa.

The following is Mr. J. G. Baker's disposition of the sub-species of this variable plant:—

1. *Main stem elongated, branching and flowering.*

Sub-sp. CANI'NA proper; rootstock short, stolons 0, leaves narrow ovate-cordate, spur obtuse, anther spurs 5 times as long as broad. *V. flaricor'nis,* Sm.; *pu'mila,* Hook. and Arn.—Extends into Arctic Europe, Siberia, and Greenland.

Sub-sp. LAC'TEA, *Sm.* (sp.); rootstock short, stolons 0, leaves ovate-lanceolate, base rounded or cuneate, petals narrow grey, spur very short, capsule subglobose.—Heaths, E. England; confined to W. Europe.

Sub-sp. STAGNI'NA, *Kitaib.* (sp.); rootstock elongated stoloniferous, leaves oblong-lanceolate base truncate, upper narrower, petals pale lilac or white, spur very short, capsule 3-gonous.—Bogs, E. of England, Galway; extends into Siberia.

2. *Main stem with a rosette of radical leaves; flowering-stem axillary.*

Sub-sp. SYLVAT'ICA, *Fries* (sp.); rootstock 0, leaves broadly ovate-cordate subacute, anther spurs very long, capsule glabrous.—VAR. 1. *Riviniа'na,* Reich. (sp.); spur compressed furrowed, fruiting sepals with prominent notched auricles.—VAR. 2. *Reichenbachia'na,* Boreau (sp.); spur narrower not furrowed, fruiting sepals with minute auricles. Copses and hedge-banks, ascending to 3,000 ft. in Wales and Scotland; also Arctic and N. American.

Sub-sp. ARENA'RIA, *DC.* (sp.); pubescent, rootstock short or 0, stolons 0, leaves broadly cordate obtuse, stipules small, spur short, capsule oblong pubescent.—Upper Teesdale, alt. 2,000 ft., very rare.—Extends into Arctic Europe.

SECTION 2. **Mela'nium.** *Upper petals* erect. *Stigma* capitate, hollow, with a pencil of hairs on each side.—No apetalous flower. *Stipules* leafy.

5. **V. tri'color,** *L.*; leaves long-petioled ovate-oblong or lanceolate crenate, stipules leafy pinnatifid, sepals with large auricles, style short straight, stigma capitate, excavated. *Heartsease* or *Pansy.*

Pastures, banks and waste places, &c.; fl. May–Sept.—Very variable. *Stem* 4–18 in., branched, erect or ascending, angular, flexuous. *Leaves* 1–1½ in., lyrate, coarsely and remotely crenate-serrate; stipules ½–½ in. across, very large, spreading like a fan, lobes deep linear or oblong obtuse, lateral smaller, middle sometimes leafy. *Bracts* minute, high up on the peduncle. *Flowers*

½–1¼ in. diam., purple whitish or golden yellow, sometimes parti-coloured.—DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to Siberia and N.W. India.—Sub-sp. *lu'tea* and *Curtis'ii* are confined to W. Europe from Belgium southwards to Naples. Sub-sp. *tri'color* and *arven'sis* proper are naturalized in America.

Sub-sp. TRI'COLOR proper; rootstock 0, stem elongate branched, petals spreading pale yellow or lilac longer than the sepals, capsule ovoid.—Cultivated ground; ascends to near 2,000 ft. in the Highlands.

Sub-sp. ARVEN'SIS, *Murray* (sp.); rootstock 0, stem elongate branched, petals erect white or yellowish not longer than the sepals, capsule globose.—Cultivated ground; ascends to near 1,000 ft. in Scotland and York.

Sub-sp. CURTIS'II, *Forster* (sp.); rootstock branched stoloniferous tufted, petals spreading blue purple or yellow rather longer than the sepals, capsule 3-gonous. *V. salulo'sa,* Boreau.—Sandy shores, rare, Cheshire to Devon; S. and W. of Ireland.

Sub-sp. LU'TEA, *Huds.* (sp.); rootstock branched, branches slender with short stems and underground runners, petals blue purple or yellow spreading longer than the sepals, capsule oblong 3-gonous.—Hilly districts from Wales and Notts northwards; ascends to 2,800 ft. in the Highlands and Yorkshire.

ORDER X. POLYGA'LEÆ.

Herbs or shrubs, erect or climbing. *Leaves* alternate or subopposite, simple, exstipulate. *Flowers* irregular. *Sepals* imbricate in bud; 2 inner larger, petaloid, winglike. *Petals* 3–5, hypogynous, 2 outer (lateral) free or united with the hooded lower into a tube split at the base behind; 2 inner equal to the outer, or smaller or 0. *Stamens* 8, filaments connate in 1 cleft sheath which is usually adnate to the petals; anthers 1- rarely 2-celled, opening by pores, rarely by valves. *Disk* small. *Ovary* free, 2-celled; style simple, curved, stigma various; ovules 1 in each cell, pendulous, anatropous, raphe ventral. *Seeds* pendulous, testa often hairy, hilum strophiolate, albumen fleshy or 0; embryo straight. — DISTRIB. Temp. and trop. regions; genera 15; species 400.—AFFINITIES, distant with *Sapindaceæ, Violaceæ,* and *Pittosporeæ.* — PROPERTIES. Bitter, emetic, purgative, and diuretic.

1. POLYG'ALA, *L.* MILKWORT.

Herbs or shrubs. *Leaves* alternate, rarely subopposite or whorled. *Flowers* in terminal or lateral racemes or spikes. *Petals* combined below with the staminal sheath. *Stamens* 8; anthers 1–2-celled, opening by transverse pores. *Capsule* compressed, loculicidally splitting along the edges. *Seeds* usually downy, with a crested raphe.—DISTRIB. Trop. and temp. regions; species 200.—ETYM. πόλυς and γάλα, being supposed to increase the milk in cows.

1. **P. vulga'ris,** *L.*; stems many leafy, leaves alternate lower oblong upper lanceolate, veins of inner sepals anastomosing copiously, capsule oblong-obovate notched, lobes of aril unequal.

Heaths and meadows; ascends to near 3,000 ft. in the Highlands; fl. June–Aug.—A small wiry perennial, 2–10 in., glabrous or very rarely pubescent. *Rootstock* short. *Leaves* ½–1½ in., rather coriaceous, quite entire. *Flowers*

$\frac{1}{6}$–$\frac{1}{3}$ in., white, pink, blue, lilac, or purple. *Sepals* purplish in flower, green in fruit.—DISTRIB. Europe (Arctic), N. Africa, Siberia, and W. Asia.

Sub-sp. VULGA'RIS proper, stems ascending, leaves all linear or lanceolate, racemes many-flowered, central bract as long as the flowering pedicel, pedicels sepals petals and capsules not ciliate.—VAR. 1, branches straight, large sepals oblong-obovate broader than the capsule. Common; ascends to near 3,000 ft. in the Highlands.—VAR. 2, *grand'iflora*, Syme; upper leaves large, inner sepals oblong acute, flowers large dark blue. Benbulben, Sligo.

Sub-sp. OXYP'TERA, *Reich.* (sp.); branches flexuous, leaves linear, inner sepals cuneate below shorter and narrower than the capsule, pedicels, &c. glabrous.—Sandy shores, limestones and chalky soils, local.—VAR. *cil'iata*; branches prostrate tortuous, inner sepals broader than the capsule, pedicels bracts sepals and capsule ciliate. Gogmagog Hills.

Sub-sp. DEPRES'SA, *Wenderoth* (sp.); stems flexuous, leaves somewhat opposite and distichous, lower oblong spathulate, racemes fewer-flowered, central bract shorter than the flowering pedicel.—Common on heaths.

2. **P. calca'rea,** *F. Schultz;* stems many, flowering shoots axillary from the rosulate obovate radical leaves, cauline leaves oblong, inner sepals obovate broader and longer than the capsules, central nerve branched beyond the middle, capsule obcordate, lobes of aril unequal. *P. ama'ra,* Don, not L.

Dry soil and rocks, S. and S.E. England; Wiltshire to Kent, and Gloucester to Berks; fl. June–July.—*Rootstock* branched. *Stem* 2–6 in.; leaves more rosulate; flowers various in colour. The flowering shoots being always axillary from the lower leaves is its best character, giving the plant an umbellate appearance: sub-sp. *depressa* of *P. vulgaris* is intermediate in this respect.—DISTRIB. Central and S. Europe.—Perhaps only a sub-species of *P. vulgaris.*

3. **P. uligino'sa,** *Fries;* leaves rosulate spathulate, from the axils of which the flowering branches spring, inner sepals oblong or obovate obtuse narrower than the capsule, veins simple or slightly branched free, capsule obcuneate notched, lobes of aril nearly equal. *P. austri'aca,* Crantz.

Very rare, margins of rills, High Force and Cronkley Fell, Teesdale, alt. 1,800 ft.; fl. June–July.—Much smaller than either of the above, 2–4 in. *Rootstock* short. *Leaves* more fleshy. *Flowers* deep pink or blue in the British form, which Syme distinguishes as a variety from the German, which is white (Reichenbach's figure is blue), and has the capsule rounded at the base.—DISTRIB. W. Europe (Arctic) from Sweden to Italy.

ORDER XI. FRANKENIA'CEÆ.

Perennial rarely annual herbs or small shrubs, with jointed internodes. *Leaves* small, opposite, exstipulate. *Flowers* small, regular, solitary, in the forks of the branches. *Calyx* tubular, persistent; lobes 4–6, induplicate in bud. *Petals* 4–6, hypogynous, free, imbricate in bud, claws with an adherent scale. *Stamens* 4 or more, free or connate at the base; anthers versatile, 2-celled. *Ovary* free, sessile, 1-celled; style slender, stigma 2–5 lobed; ovules many, in 2 series, on 2–5 parietal placentas, amphitropous with the micropyle below; funicle slender. *Capsule*

enclosed in the persistent calyx, 3–5-valved. *Seeds* oblong, raphe linear, testa crustaceous, albumen mealy; embryo axile, straight. — DISTRIB. Temp. and warm regions, chiefly littoral; genera 1; species about 12.— AFFINITY with *Caryophylleæ* and *Tamariscineæ*.—PROPERTIES none.

1. FRANKE'NIA. SEA-HEATH.

Characters of the order.

1. **F. læ'vis,** *L.*; stem pubescent, leaves with revolute margins.

Salt marshes on S.E. coasts of England, Yarmouth to Kent; fl. July–Aug.— Perennial, procumbent. *Stems* wiry. *Leaves* $\frac{1}{8}$–$\frac{1}{4}$ in., fascicled or whorled, oblong but linear from the reflexed margins, glabrous, ciliate at the base. *Flowers* small, rose-coloured. *Capsule* 3-gonous.—DISTRIB. Central and S. Europe, N. Africa, W. Asia to India.

ORDER XII. CARYOPHYLLE'LEÆ.

Herbs sometimes woody at the base, with thickened nodes. *Leaves* opposite, usually connate at the base, entire; stipules 0, or small and scarious. *Inflorescence* definite, centrifugal. *Sepals* 4–5, free or connate, imbricate in bud. *Petals* 4–5 (rarely 0), hypogynous, rarely perigynous, imbricate or contorted in bud. *Stamens* 8–10, rarely fewer, inserted with the petals, filaments filiform. *Disk* annular hypogynous or perigynous, or elongated, or broken up into glands. *Ovary* free, 1-celled, or 3–5-celled at the base; styles 2–5, free or connate below, stigmatose on the inner surface; ovules 2 or more, on slender basal funicles, which are often connate into a short column, amphitropal, micropyle inferior or transverse. *Capsule* dehiscing by valves. *Seeds* many, small, often reniform, albumen floury rarely fleshy; embryo cylindric, curved, radicle incumbent.—DISTRIB. Cosmopolitan, but chiefly Arctic, Alpine, European, and W. Asiatic; genera 35, species 800.—AFFINITIES with *Paronychieæ*, *Portulaceæ*, and *Chenopodiaceæ*.—PROPERTIES unimportant.

TRIBE I. **SILE'NEÆ.** *Calyx* 4–5-lobed. *Disk* elongated, bearing the petals and stamens. *Styles* free. *Stipules* 0.

* *Hilum on the face of the peltate seed. Embryo straight*.....1. Dianthus.

** *Hilum lateral. Embryo annular.*

Styles 2. Capsule 4-valved .....1*. *Saponaria.*
Styles 3. Capsule 3–6-valved .....2. Silene.
Styles 4–5. Capsule 4–5–8–10-valved.
Petals appendiculate.....3. Lychnis.
Petals exappendiculate.....4. Githago.

TRIBE II. **ALSI'NEÆ.** *Sepals* free. *Disk* small. *Styles* free.

* *Stipules* 0.

Capsule cylindric, 6-valved. Petals jagged. Styles 3. .....5. Holosteum.
Capsule cylindric, 8–10-valved. Petals notched (rarely entire)..6. Cerastium.
Capsule globose, 6–10-valved; styles 3–5. Petals 2-fid. .....7. Stellaria.
Capsule 3, 4, 6, or 10-valved. Styles 3–4. Petals entire.....8. Arenaria.
Capsule 4–5-valved. Styles 4–5. Petals entire or 0 .....9. Sagina.

** *Stipules scarious.*

Styles and valves of capsule 5.....10. Spergula.
Styles and valves of capsule 3 .....11. Spergularia.

TRIBE III. **POLYCAR'PEÆ.** *Sepals* free. *Disk* small. *Petals* small. *Stamens* 5 or fewer. *Styles* combined at base .....11*. *Polycarpon.*

1. DIAN'THUS. PINK and CARNATION.

Tufted herbs, often shrubby at the base. *Leaves* narrow, grass-like. *Flowers* solitary, panicled, or fascicled. *Calyx* tubular, 5-toothed, striate, with imbricating bracteoles at the base. *Petals* 5, entire or cut, claw long. *Stamens* 10. *Disk* elongated. *Ovary* 1-celled; styles 2. *Capsule* 4-valved at the top. *Seeds* discoid, imbricate upon the columnar placenta; embryo straight.—DISTRIB. Europe, temp. Asia, N.W. America, N. and S. Africa; species about 70.—ETYM. Διός and ἄνθος, *flower* of *Jupiter.*

* *Flowers in dense fascicles.*

1. **D. Arme'ria,** *L.*; bracts lanceolate downy as long as the calyx, tips, subulate. *Deptford Pink.*

Fields and dry banks from Cumberland to Devon and Kent; a doubtful native, *Watson;* fl. July–Aug.—Annual. *Stems* 1–2 ft., few, strict, erect. *Leaves* 1–2 in., linear, lower obtuse, upper acute. *Fascicles of flowers* dichotomous. *Calyx-tube* 2–3 in. cylindric, many-nerved. *Flowers* ½ in. diam. *Petals* distant, narrow, red with dark dots, toothed.—DISTRIB. Europe, W. Asia; introd. in the U. States.

2. **D. pro'lifer,** *L.*; fascicles of flowers capitate, bracts ovate membranous as long as the calyx-tube, inner obtuse.

Gravelly pastures S. and E. of England, rare, Windsor, Norwich, formerly near Ryde, Jersey; a doubtful native, *Watson;* fl. June–Oct.—Annual. *Stems* few, 6–18 in., sometimes branched above. *Leaves* short, linear-lanceolate, margins scabrid. *Heads* ¾ in., many-flowered, enclosed in dry brown bracts. *Flowers* ¼–½ in. diam., opening one by one. *Calyx* faintly ribbed. *Petals* contiguous, purplish-red, obovate, emarginate. *Capsule* ovoid, rupturing the calyx.—DISTRIB. Europe, W. Asia; introd. in the U. States.

** *Flowers solitary or loosely cymose.*

3. **D. deltoi'des,** *L.*; leaves narrow-lanceolate downy and subscabrous, lower obtuse, flower solitary, bracts ovate acuminate half as long as the calyx-tube, petals toothed. *Maiden Pink.*

Fields and banks, dry soil, from Moray and Argyle southwards; absent from Ireland; fl. June–Sept.—Perennial, much branched; branches slender, 1 ft. *Leaves* of barren shoots ligulate. *Flowers* ¾ in. diam., rarely 2 together, inodorous. *Calyx* glabrous, strongly ribbed. *Petals* distant, obovate, rosy, spotted with white. *Capsule* cylindric.—DISTRIB. Europe.

VAR. 1, *deltoi'des* proper; faintly glaucous, bracts generally 2, flowers rosy. —VAR. 2, *glauʹcus,* L. (sp.); very glaucous, bracts usually 4, flowers white. —King's Park, Edinburgh.

4. **D. cæ'sius,** *Sm.*; leaves scabrous at the margin, flowers usually solitary, bracts orbicular mucronate 4 times shorter than the calyx-tube, petals jagged and bearded. *Cheddar Pink.*

Limestone rocks, Cheddar; fl. June–July.—Perennial, glaucous. *Rootstock* woody, branched. *Stems* 4–10 in., many. *Leaves* of barren shoots linear, obtuse, upper ones of the flowering stems acute. *Bracts* membranous.

Flower 1 in. diam., fragrant. *Petals* obovate, rosy, contiguous, teeth ⅛–¼ the length of the blade. *Calyx-tube* faintly ribbed.—DISTRIB. Belgium southwards to Lombardy and Hungary.

D. CARYOPHYL'LUS, *L.*; leaves grooved above, margin smooth, cymes loosely panicled, bracts obovate mucronate 3–4 times shorter than the calyx-tube, petals toothed and crenate. *Wild Carnation, Clove Pink.*

Old castle walls, &c., naturalized; fl. July–Aug.—Perennial, glabrous, glaucous, stout, much branched and leafy below, 18–24 in. *Leaves* 4–6 in., recurved. *Bracts* membranous, tips herbaceous. *Flower* 1½ in. diam., fragrant. *Calyx* cylindric, faintly ribbed. *Petals* obovate, rosy, teeth ⅛–¼ the length of the blade. *Capsule* ovoid.—DISTRIB. Belgium and France to Italy, Hungary and Greece.—Flowers dimorphic on the same individual; stamens in one form much longer than in the other. The origin of the garden Carnation.

D. PLUMA'RIUS, *L.*; leaves all acute 1-nerved, margin scabrous, cymes loosely panicled, bracts 4 rhomboid cuspidate equalling ¼ of the calyx-tube, petals fimbriate. *Wild Pink.*

Naturalized in Shalford, Surrey; East Ham, Essex; Haughmond Abbey, Ludlow and Conway Castles; fl. June–Aug.—Perennial, cæspitose, branched, 1 ft. *Flower* as in *D. Caryophyllus*, but smaller, rose-purple, segments of petals ⅓–½ as long as the blade.—DISTRIB. Mid. Europe from Austria to Lombardy and Mid. Russia.—The origin of the Garden Pinks.

1*. *SAPONA'RIA*, *L.* SOAPWORT, FULLER'S HERB.

Annual or perennial herbs. *Radical leaves* spathulate, cauline narrower. *Flowers* in panicled or fascicled cymes, white, lilac, red or yellow. *Calyx* tubular, 5-toothed, obscurely nerved, ebracteate. *Petals* 5, clawed, entire or notched. *Stamens* 10. *Disk* small. *Styles* 2. *Capsule* oblong, 2-celled at the base, 4-valved at the top. *Seeds* reniform, tubercled; embryo annular.—DISTRIB. Europe and temp. Asia; species 30.—ETYM. *Sapo*, the plant having been used as a *soap*.

1. S. OFFICINA'LIS, *L.*; glabrous, glaucous, leaves oblong-lanceolate.

Hedges, roadsides, and fields, apparently naturalized in S.W. England and N. Wales; a denizen, *Watson*; fl. Aug.–Sept.—*Rootstock* white, creeping, fleshy, stoloniferous. *Stem* 1–3 ft., straight, ascending. *Leaves* 2–4 in., 3-ribbed. *Cymes* in panicled corymbs. *Flowers* 1 in. diam. *Petals* obcordate, lilac or white. *Capsule* ovoid, 2-celled at the base, on a stout pedicel, enclosed in the fusiform calyx-tube.—DISTRIB. Europe, W. Asia; introd. in U. States.—A decoction is very saponaceous. Flower often double. *S. hybrida*, L. is a variety with connate upper leaves and monopetalous corolla.

2. SILE'NE, *L.* CATCHFLY.

Habit of *Saponaria* and *Dianthus*. *Calyx* inflated, 5-toothed, 10-nerved. *Petals* 5; claw narrow; blade entire or divided, with usually 2 scales at its base. *Stamens* 10, the 5-petaline sometimes adherent to the claw. *Disk* columnar. *Ovary* 1–3-celled below the middle; *styles* 3, rarely 2–5, opposite the sepals; ovules many. *Capsule* 6-valved at the top. *Seeds* with a marginal hilum; embryo annular or ½-annular.—DISTRIB. N. temp. hemisphere; species 200.—ETYM. σίαλον, *saliva*, from the viscidity of some species.

* *Calyx bladdery, nerves reticulate. Capsule incompletely septate.*

1. **S. infla'ta,** *Sm.*; stem erect, panicle many-flowered, bracts scarious, petals deeply cloven, scales obscure. *Cucubalus Behen,* L.

Roadsides and waste places; ascending to near 1,000 ft. in Yorkshire; fl. June–Aug.—Perennial, branched, 2–3 ft., glaucous, glabrous or downy. *Leaves* 1–3 in., variable, ovate obovate or oblong. *Flowers* ¾ in. diam., drooping, white. *Capsule* globose, top conical.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to N.W. India; introd. in the U. States.

VAR. *puber'ula,* leaves downy. Rarer.

2. **S. marit'ima,** *L.*; stems diffuse, flowers 1–4, bracts herbaceous, petals shortly cleft, segments broad with two scales at the base.

Sea-shores, abundant, more rare by Alpine streams; ascending to 3,000 ft. in the Highlands; fl. June–Aug.—Very nearly allied to *S. inflata,* easily recognized by the above characters.—DISTRIB. Shores of Europe (Arctic), from Italy westward to the Canaries, and northward to Norway and Finland.

** *Calyx cylindric, strongly many-ribbed, closing tightly over the capsule at the top. Capsule incompletely septate.*

3. **S. con'ica,** *L.*; hairy and glandular, erect, dichotomously branched, flowers many erect.

Pastures and sandy heaths, local; Kent, Norfolk, Suffolk, Haddington and Forfar; fl. May–July.—Annual, 6–12 in. *Leaves* linear, upper acute and ribbed. *Calyx* ½ in., ampulliform, 30-ribbed, intruse at the base; teeth subulate. *Petals* small, rosy or purple, cleft, with 2 scales at the base of the blade; gynophore very short.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India.

*** *Calyx with* 10 *broad nerves. Capsule incompletely septate.*

4. **S. an'glica,** *L.*; everywhere hairy and viscid, lower leaves spathulate, flowers in leafy racemose cymes, calyx-teeth setaceous, petals and scales small entire or slightly 2-fid.

Gravelly places from Moray southwards, not rare, probably often an escape; fl. June–Oct.—Annual, 1–2 ft., erect or diffusely branched. *Leaves* variable. *Calyx* ½ in., membranous with green pubescent ribs. *Capsules* ovoid, on usually deflexed peduncles.—DISTRIB. Europe, N. Africa, Siberia, N. Asia to N.W. India.

VAR. 1, *gal'lica,* Koch (sp.); flowers white or pink, petals 2-fid.—VAR. 2, *quinquevul'nera,* L. (sp.); petals entire white with a red spot.

5. **S. acau'lis,** *L.*; densely tufted, sub-dicecious, leaves small linear-subulate close set, flowers shortly peduncled solitary erect, calyx tubular teeth obtuse, petals notched and with a notched scale. *Moss Campion.*

Wet Alpine rocks, ascending to 4,300 ft.; fl. June–Aug.—Perennial, forming bright green, moss-like cushions. *Leaves* ¼–½ in., channelled above, keeled below, ciliate. *Flowers* pink, ½ in. diam., peduncles lengthening after flowering. *Calyx* faintly nerved; teeth with scarious margins. *Capsule* exserted, subcylindric, 5-toothed.—DISTRIB. Alps of Europe, N. Asia, N. America; all Arctic regions.

6. **S. Oti'tes,** *L.*; flowering stems erect viscid simple few-leaved, radical leaves narrow-spathulate, cymes panicled, flowers small sub-dicecious erect whorled, calyx-teeth obtuse, petals linear, scales 0.

Sandy fields and roadsides of the E. counties, local; fl. June–Aug.—*Rootstock* woody, branched. *Stem* 1–3 ft. *Radical leaves* ½–3 in., many, slender, puberulous. *Panicle* narrow, interrupted. *Flowers* ⅛ in. diam., many, sub-erect, pale yellow-green; bracts membranous. *Calyx* obovoid, membranous. *Petals* entire. *Stamens* and *styles* much exserted. *Capsule* ovoid, rupturing the calyx.—DISTRIB. Europe, Siberia, W. Asia to Persia.

7. **S. nu'tans,** *L.*; pubescent, stem above and calyx viscid, radical leaves oblong-lanceolate, cauline linear, flowers in panicled or subracemed cymes drooping, calyx-teeth acute, petals 2-partite, scales lanceolate. *S. paradoxa,* Sm. *Nottingham Catchfly.*

Dry places and walls, Nottingham and other castles, rare; S. Kent, Dovedale, Orme's Head, Conway, Fife, Forfar, Kincardine, Jersey; fl. May–July.—*Rootstock* woody, branched. *Radical leaves* 2–5 in., tufted, petioled; cauline small, narrow, sessile. *Flower-stems* 2–3 ft. *Calyx* ½ in., tubular, swollen in the middle, membranous, nerves purple. *Petals* white or pink, segments diverging, narrow, incurved. *Capsule* erect, exceeding and rupturing the calyx.—DISTRIB. Europe (Arctic), Siberia, Dahuria, Canaries. —Flowers dimorphic, fragrant at night.

**** *Calyx cylindric or ovoid, 10-nerved. Capsule without any septa.*

8. **S. noctiflo'ra,** *L.*; softly pubescent, viscid above, leaves all oblong-lanceolate acute the lower petioled, flowers 1 or few all 2-sexual, calyx-tube long, teeth slender, petals 2-fid, scales truncate.

Sandy fields, on the E. coasts only; Forfar to Sussex; fl. July–Aug.—Annual, 1–2 ft., erect, simple or dichotomous. *Leaves* 3–4 in., ½–1½ in. broad. *Flowers* erect. *Calyx* 1 in., narrow in flower; nerves green. *Petals* rosy within, yellow outside, segments incurved by day. *Capsule* as long as, and often rupturing, the calyx.—DISTRIB. Europe, Siberia, W. Asia to India; introd. in U. States.—Flowers open at night and very fragrant.

3. LYCH'NIS, *L.* CAMPION.

Characters of *Silene,* but styles 5. *Sepals* not foliaceous. *Petals* with an appendage at the base of the blade. *Styles* and *carpels* opposite the sepals. —DISTRIB. N. temp. hemisphere; species 30.—ETYM. λύχνος, from the *flame-like* flowers of some species. — Styles sometimes, but rarely, 3–4, when the species may be referred with equal justice to *Silene.*

* *Petals 4-cleft. Capsule 5-toothed, without septa.*

1. **L. Flos-cu'culi,** *L.*; flowers in loose dichotomous cymes, petals 4-cleft. *Ragged Robin.*

Moist meadows, copses, &c.; ascends to near 2,000 ft. in the Highlands; fl. May–June.—Glabrous. *Rootstock* slender. *Stem* 1–2 ft., roughish above. *Radical leaves* petioled, oblong-lanceolate, acuminate; cauline narrow. *Flowers* drooping, pedicels slender. *Calyx* ½ in., veins purple; teeth acuminate. *Petals* rosy, rarely white, segments linear; scales long, 2-fid. *Capsule* broadly ovoid, very shortly pedicelled.—DISTRIB. Europe (Arctic), Siberia.

** *Petals notched or 2-fid. Capsule 5-toothed, with incomplete septa.*

2. **L. Visca'ria,** *L.*; stem viscid at the nodes, petals notched.

Limestone rocks in N. Wales, and trap rocks local, in Mid. and S. Scotland; fl. June–Aug.—Glabrous, stout, 6–10 in. *Rootstock* perennial, woody. *Radical*

leaves 3–5 in., very narrow-lanceolate, petioles downy at the margins. *Cymes* very contracted, panicled, few-flowered. *Flowers* almost sessile. *Calyx* ½ in., membranous, purple, dilated upwards; teeth short, acute. *Petals* obovate, red-purple; scales short. *Capsule* broadly ovoid; pedicel slender, ½ as long as the capsule.—DISTRIB. Europe (excl. Spain and Greece) to the Caucasus, Siberia.

3. **L. alpi'na,** *L.*; tufted, not viscid, cymes compact, petals 2-lobed.

Alpine moors and ravines; Hobcartin Fell, Cumberland; Little Kilrannock, Perthshire; Clova Mts., ascending to 3,000 ft.; fl. June–July.—Glabrous, 4–8 in. *Rootstock* short, much branched. *Leaves* 1–2 in., crowded, narrow, linear-lanceolate. *Flowers* nearly ½ in. diam., shortly peduncled, bracts red. *Calyx* nerves faint, teeth rounded. *Petals* rosy. *Capsule* ovoid, pedicel half its length.—DISTRIB. Arctic and high alps of Europe (excl. Greece and Turkey), Siberia to Dahuria, Arctic America.

*** *Petals* 2-*partite. Capsule* 10-*toothed, without any septa. Flowers sub-dioecious.*

4. **L. diur'na,** *Sibth.*; calyx reddish, teeth triangular acute, petals red, capsule subglobose teeth recurved. *L. dioica α,* L. *Red Campion.*

Damp copses and hedgebanks; fl. June–July.—Softly hairy, rarely quite glabrous, viscid above. *Rootstock* slender, branched. *Radical leaves* 3–6 in., obovate, petioled; cauline narrower. *Flowering stem* 1–3 ft., erect. *Flowers* in loose dichotomous cymes. *Calyx* ½ in., subcylindric, reddish, rarely green. *Petals* red, rarely white, lobes oblong; scales lanceolate. *Capsule* mouth wide; gynophore very short.—DISTRIB. Europe (Arctic) to the Caucasus, Siberia to Baikal, Greenland.

5. **L. vesperti'na,** *Sibth.*; calyx greenish, teeth elongate, petals white, capsule conical, teeth short linear-lanceolate erect. *White Campion. L. dioica β, L.*

Fields, hedgerows, &c.; fl. June–Sept.—Very similar to the last, and probably only a sub-species. *Flowers* rarely reddish, fragrant in the evening.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in the U. States.

4. GITHA'GO, *Desfontaines.* CORN-COCKLE.

Characters of *Lychnis*, but calyx coriaceous with foliaceous teeth. *Petals* without scales at the base of the blade, entire. *Styles* and *carpels* opposite the sepals.—DISTRIB. Europe, Siberia, W. Asia to Persia; introd. in U. States; species 1.—ETYM. obscure.

1. **G. se'getum,** *Desf.*; flowers solitary, calyx woolly segments much longer than the petals. *Agrostem'ma Githago,* L.

Cornfields; a colonist, *Watson;* fl. June–Aug.—Annual; clothed with dense white hairs. *Stem* 1–2 ft. *Leaves* 2–5 in., linear-lanceolate. *Flowers* 1½–2 in. diam.; peduncles long. *Calyx* 1–1½ in., cylindric-ovoid, ribs strong. *Petals* pale purple, limb obovate. *Capsule* ovoid.

5. HOLOS'TEUM, *L.*

Annual herbs, viscid and glandular. *Leaves* narrow. *Flowers* in terminal umbel-like cymes. *Sepals* 5. *Petals* 5, toothed or notched. *Stamens* 3–5, rarely 10. *Ovary* 1-celled; styles 3, rarely 4 or 5; ovules many. *Capsule* subcylindric, with twice as many short terminal valves as there are styles. *Seeds* concavo-convex, rough; embryo horseshoe-shaped.—DISTRIB. Europe, W. Asia; species 3.—ETYM. unknown.

1. **H. umbella'tum,** *L.* ; lower leaves petioled elliptic-oblong.

Old walls and thatched roofs, very rare, Norwich, Eye, and Bury St. Edmunds; a denizen or native? *Watson;* fl. April–May.—*Stem* 4–8 in., very slender, branched at the base. *Radical leaves,* ½–1 in.; cauline very few, sessile, ovate or linear. *Flowers* few, erect; pedicels ½ in., deflexed after flowering, erect in fruit; bracts small, membranous. *Sepals* white, edges scarious, obtuse. *Petals* ¼ in., a little longer than the sepals, white or pale pink. *Stamens* and styles often 3 each. *Capsule* twice as long as the sepals. *Seeds* black.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India.

6. CERAS'TIUM, *L.* MOUSE-EAR CHICKWEED.

Pubescent rarely glabrous herbs, the hairs articulate, some glandular, others not. *Leaves* small. *Flowers* white, in terminal dichotomous cymes. *Sepals* 5, rarely 4. *Petals* as many, rarely 0, notched or 2-fid, rarely quite entire or much cut. *Stamens* 10, sometimes 5 or fewer. *Ovary* 1-celled; styles usually 3 or 5, ovules many. *Capsules* cylindric, often incurved, with twice as many short terminal valves as styles. *Seeds* compressed, often tubercled; embryo annular.—DISTRIB. All temp. and cold regions; species 40.—ETYM. κέρας, from the *horn*-like capsule.

SECTION 1. **Mœnch'ia,** *Ehr.* (gen.). *Sepals* acuminate, longer than the entire petals.

1. **C. quaternel'lum,** *Fenzl;* glabrous, glaucous, stamens 4. *Mœnchia erecta,* Ehr.

Gravelly pastures, &c. from Northumberland (rare) southwards; ascends to 1,200 ft. in Wales; fl. May–June.—Annual. *Stems* 2–6 in., dichotomously branched from the base; branches slender, stiff. *Leaves* 1 in., linear, radical sublanceolate; cauline few, shorter, broader. *Flowers* few; pedicels long, erect, stiff. *Sepals* 4, ¼ in.; margins broad, membranous, white. *Petals* 4, shorter than the sepals, oblong. *Styles* 4, short. *Capsule* subcylindric, as long as the sepals, 8-toothed.—DISTRIB. W. Europe from Holland southwards and west to Hungary, N. Africa; introd. in the U. States.

SECTION 2. **Ceras'tium** proper. *Petals* notched, 2-fid, or erose.

* *Annual rarely perennial, hairy and viscid except* C. triviale. *Sepals 4–5, a long as the petals.* (Perhaps all subspecies of one.)

2. **C. tetran'drum,** *Curtis;* cyme leafy, pedicel usually erect when fruiting 2–3 times as long as the capsule, bracts herbaceous, sepals 4 rarely 5 acuminate glandular margins narrowly membranous, capsule straight. *C. atrovirens* and *pedunculatum,* Bab.

Sandy and waste places near the sea; fl. April–Oct.—*Stem* 4–12 in., dichotomously branched from the base. *Radical leaves* obovate-lanceolate; cauline usually broader upwards. *Flowers* ¼ in. diam. *Petals* notched, veins branched. *Capsule* scarcely longer than the sepals.—DISTRIB. W. Europe from Sweden to Spain and westwards to Hungary.

3. **C. semidecan'drum,** *L.*; cyme few- or many-flowered, pedicels a little exceeding the calyx deflexed between flowering and fruiting, bracts half-membranous, sepals usually 5 glandular acute margins broadly membranous, capsule slightly curved.

Walls and banks; ascending to near 1,000 ft. in Yorkshire; fl. March–May. —*Stem* 1–10 in., erect or decumbent, sometimes nearly glabrous, branched from the base. *Leaves* as in *C. tetrandrum*. *Petals* erose, with simple veins, shorter than the sepals. *Stamens* 4–5, or 10. *Capsule* exserted.—DISTRIB. Europe, N. Africa.—Flowers long before *C. viscosum*.

VAR. ? *pu'milum*, Curtis (sp.); upper bracts with narrow membranous edges, petals notched, veins branched, fruiting pedicel short curved, capsule curved. *C. glutino'sum*, Fries.—Dry banks, rare, I. of Wight, Bristol, Surrey. —Intermediate in many points between *C. tetrandrum* and *semidecandrum*.

4. **C. glomera'tum,** *Thuillier;* cymes at first subcapitate, fruiting pedicels suberect shorter than the sepals, bracts all herbaceous, sepals acute with few glands and narrow membranous borders, petals as long as the sepals 2-fid rarely 0, capsule twice as long as the sepals curved. *C. vulga'tum*, L., and *visco'sum*, L. in part.

Dry places, ascending to 1,000 ft. in Westmoreland and Scotland; fl. April–Sept.—Habit of the preceding, but usually larger, less glandular and cymes more fascicled.—DISTRIB. Europe (Arctic), N. Africa, W. Asia to the Himalaya, Iceland, Greenland, &c.; introd. in U. States.

5. **C. trivia'le,** *Link;* cymes lax, pedicels longer than the sepals reflexed between flowering and fruiting, primary bracts wholly herbaceous, margins of secondary sometimes membranous, sepals obtuse margins broad membranous, petals 2-fid, capsule twice as long as the sepals curved. *C. viscosum* L. of Hook. and Arn.

Waste places; ascending to 3,600 ft. in Scotland; fl. April–Aug.—Similar to *C. glomeratum*, but usually perennial, often with leafy barren shoots. Syme alludes to an exotic alpine form that has petals twice as long as the sepals. —All Europe from the Arctic circle southwards, N. and W. Asia to Spitzbergen and the Himalaya, N. Africa; introd. in U. States.

VAR. 1, *trivia'le* proper; perennial, decandrous, hairs not glandular, sepals pubescent.—VAR. 2, *holosteoi'des*, Fries (sp.); perennial, stem with only 2 lines of pubescence, sepals glabrous. Newcastle and Perth.—VAR. 3, *pentandrum;* annual, pentandrous, capsule shorter, sepals as in VAR. 1. Seashores.

** *Perennial, downy or woolly. Petals* 5, *twice as long as the sepals,* 2-*fid.*

6. **C. arven'se,** *L.*; stems hairy all round, leaves linear-lanceolate, bracts and sepals subacute, margins and tip membranous, seeds sharply tubercled.

Sandy fields and waste places, not uncommon in England, rarer in Scotland; local in Ireland; fl. April–Aug.—*Branches* 6–10 in., tufted, ascending. *Leaves* crowded on the basal shoots. *Cymes* many-flowered. *Sepals* oblong-lanceolate, glandular. *Capsule* a little longer than the sepals.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, N. America, Fuegia, Chili.

VAR. 1, *pubes'cens*, Syme; leaves soft and pubescent, cymes 3–10-flowered.—VAR. 2, *Andrew'sii*, Syme; leaves rigid glabrescent, midrib strong below, flowers subsolitary.

7. **C. alpi'num,** *L.*; stems hairy all round, leaves ovate or oblong-ovate obtuse pubescent, cymes dichotomous often 1-flowered, bracts herbaceous obtuse, sepals with often a faint membranous margin, seeds sharply tubercled.

Alpine and subalpine rocks, England, Wales, and Scotland; ascending to near 4,000 ft.; absent from Ireland; fl. June-Aug.—Habit of *C. arvense*, but leaves much broader and flowers fewer and much larger, ¾–1 in. diam., with scarcely any glands; and capsule almost twice as long as the sepals.—DISTRIB. Mountains of Europe, N. America, and all Arctic regions.

VAR. 1, *lana'tum*, Lamk. (sp.); covered with long woolly hairs.—VAR. 2, *pubes'cens*, covered with short hairs.

8. **C. latifo'lium**, *Sm.*; stems hairy all round, leaves ovate or oblong obtuse pubescent, flowers usually solitary, lower bracts herbaceous, sepals obtuse margins broadly membranous, seeds obtusely tubercled.

Alpine rocks in Wales and Scotland, ascending to 3,600 ft., rare; fl. May–Aug. —Very like *C. alpinum*, perhaps a sub-species of that plant; it does not precisely accord with the Continental *C. latifolium* (itself too near *alpinum*), and is altogether a very doubtful species.—DISTRIB. (of the European form), Alps and Arctic regions, from Lapland to Italy, and from France to Austria; Greenland and Arctic America.

VAR. 1, *Smith'ii;* yellow-green, loosely tufted, glandular and hairy, sepals almost eglandular. *C. latifolium*, Sm. N. Wales and Scotch Alps.—VAR. 2, *compac'tum*, Syme; light green, densely tufted, glandular and hairy, sepals glandular. Braemar.—VAR. 3. *Edmondstone'i*, Watson (var. *nigrescens*, Syme); deep green, wanting the articulated hairs, stem-leaves broader, sepals broader and glandular. Unst in Shetland.

9. **C. trigy'num**, *Villars;* stem with alternating hairy lines, leaves small narrow oblong-lanceolate glabrous, cymes 1–3-flowered, bracts herbaceous margins broadly membranous glandular or glabrous. *Stella'ria cerastoides*, L.

Alpine and subalpine rills and springs in Scotland, ascending to 3,700 ft., rare; fl. July–Aug.—A smaller and more delicate species than the two preceding alpine ones, nearly glabrous. *Leaves* ¼–½ in., distant, obtuse, often recurved. *Flowers* ½ in. diam., on very slender pedicels. *Sepals* linear-oblong, spreading, 1-nerved. *Petals* deeply 2-fid. *Styles* 3–5, usually 3. *Capsule* longer than the sepals.—DISTRIB. Alps of Europe (Arctic), Siberia, W. Asia to the Himalaya, all Arctic regions.—Altogether intermediate between *Cerastium* and *Stellaria*.

7. STELLA'RIA, *L.* STITCHWORT.

Slender usually glabrous herbs. *Leaves* grassy or broad. *Flowers* in dichotomous cymes, white, small. *Sepals* 5, rarely 4. *Petals* 5, rarely 4, 2-fid or 2-partite. *Stamens* 10, rarely 8, more or less perigynous. *Disk* annular, sometimes divided into glands. *Ovary* 1-celled; styles 3; ovules many. *Capsule* short, splitting below the middle into as many simple or 2-fid valves as there are styles. *Seeds* compressed, granulate; embryo annular.—DISTRIB. All temp. and cold regions; species 70.—ETYM. *Stella*, in allusion to the *star*-like flowers.

SECTION 1, **Mala'chium**, *Fries* (gen.). *Sepals* free to the base. *Styles* 5, rarely 3. *Capsule* with 5 2-fid valves.

1. **S. aquat'ica**, *Scopoli;* slightly glandular above, stems diffuse decumbent angular, leaves ovate-cordate. *Cerastium aquaticum*, L.

Borders of ditches, streams, &c. from Cheshire southwards; fl. July–Aug.—Perennial. *Stem* 1–3 ft., brittle, branched, trailing over bushes. *Leaves* 1–1½ in., membranous, lower shortly petioled, acute, sometimes ciliate.

Flowers ½ in. diam., axillary. *Sepals* lanceolate, enlarged in fruit. *Petals* white, lobes diverging. *Capsule* 1 in., ovoid, a little longer than the sepals, peduncle deflexed, curved at the tip. — DISTRIB. Europe, N. Africa, Siberia, W. Asia.

SECTION 2, **Stella'ria** proper. *Sepals* free to the base. *Stamens* subperigynous. *Styles* 3. *Capsule* with 6 entire valves.

2. **S. nem'orum,** *L.*; stem glabrous or hairy all round, leaves ovate acuminate, lower subcordate long-petioled, upper cauline sessile, cyme lax, petals longer than the sepals.

Shady places, from Dumbarton and Moray southwards to S. Wales; ascends to 1,200 ft. in Yorkshire; absent from Ireland; fl. May–Aug.—Glabrous or pilose with jointed hairs and slightly glandular. *Stem* 1–2 ft., stout, terete, brittle, shining. *Leaves* 1–3 in., membranous, ciliate. *Flowers* ½–¾ in. diam.; pedicels very slender. *Sepals* lanceolate, obtuse, edges scarious. *Capsule* ovoid, as long as the sepals; pedicels spreading or reflexed.—DISTRIB. Europe (Arctic), excl. Greece and Turkey.

3. **S. me'dia,** *L.*; stem procumbent with a line of hairs, leaves ovate acuminate, lower petioled, upper sessile, cymes many-flowered, petals shorter than the glandular sepals sometimes 0, stamens 3–10. *Chickweed.*

Cultivated and waste ground, ascending to 2,700 ft. in Scotland; fl. March–Oct.—One of the commonest and most variable of plants, 6–18 in., easily recognised by the line of hairs on the stem and branches.—DISTRIB. All Arctic and N. temp. regions; naturalized elsewhere.

VAR. 1, *me'dia* proper; pedicels pubescent, sepals hairy, petals present, stamens 5, seeds punctate and obtusely tubercled. — VAR. 2, *Borœ'ana,* Jordan (sp.); pedicels pubescent, sepals hairy, petals 0, stamens 3, seeds smaller obscurely punctate and tubercled. —VAR. 3. *neglec'ta,* Weihe (sp.); stem suberect, pedicels pubescent, sepals hairy as long as the petals, stamens 10, seeds as in VAR. 1.—VAR. 4, *umbro'sa,* Opitz (sp.); stem erect or ascending, pedicels almost glabrous elongate, sepals glabrous with raised points, seeds fuscous acutely tubercled. Sussex, Dorset, Somerset, York.

4. **S. Holo'stea,** *L.*; stem suberect 4-angled, angles rough, leaves sessile connate lanceolate acuminate ciliate, petals twice as long as the almost nerveless sepals.

Copses and hedgerows, &c.; ascending to 1,900 ft. in the Highlands; fl. April–June.—Perennial. *Stem* 1–2 ft., decumbent at the base, brittle at the nodes, hairy above. *Leaves* 1–4 in., rigid. *Flowers* ½–¾ in. diam., white, pedicels slender. *Capsule* globose.—DISTRIB. Europe, W. Asia.— Flowers sometimes double; petals occasionally laciniate.

SECTION 3, **Larbræ'a,** St. Hilaire (gen.). *Sepals* united at the base into a conical tube. *Stamens* very perigynous. *Styles* 3. *Capsule* 6-valved.

5. **S. glau'ca,** *Withering;* glaucous, glabrous, stem suberect 4-angled, leaves very narrow sessile margins even, pedicels very long axillary, petals longer than the 3-nerved sepals.

Marshy places, not uncommon from the Clyde and Forth southwards, rare in Ireland; fl. May–July.—Perennial. *Stems* 1–2 ft., very slender. *Leaves* 1–2 in., oblong-lanceolate, or linear-oblong. *Flowers* ½–¾ in. diam., few, distant. *Bracts* membranous. *Sepals* lanceolate, acute, margins broad, scarious.

Capsule ovoid, as long as the sepals, pedicel spreading.—DISTRIB. Europe, Siberia, W. Asia to the Himalaya, Greenland.

6. **S. gramin'ea,** *L.*; glabrous, stem suberect 4-angled, leaves very narrow sessile ciliate, cymes branched, petals about as long as the 3-nerved sepals.

Meadows, hedgebanks, &c. on a dry soil; ascends to 1,500 ft. in Yorkshire; fl. May–Aug.—Perennial, not glaucous. *Stem* 1–3 ft. *Leaves* as in *S. glauca*, but ciliate. *Flowers* ½–¾ in. diam., many. *Bracts* scarious, ciliate. *Pedicels* reflexed after flowering, then spreading. *Sepals* acute. *Capsule* ovoid, nodding, a little longer than the sepals.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya.—*S. scapigera*, Willd., found by Don in Perth and Inverness-shire, is a cultivated abnormal form of this, with short stems, imbricate leaves, long erect solitary peduncles, and small flowers.

7. **S. uligino'sa,** *L.*; glaucous, nearly glabrous, stem 4-angled, leaves ovate-lanceolate, cymes few-flowered, sepals lanceolate acute, petals minute.

Wet places; ascending to 3,300 ft. in the Highlands; fl. May–July.—Annual, 3–18 in., erect or diffuse, variable in size, habit, and breadth of leaves, 1- or more-flowered, glabrous, or with a few hairs at the bases of the leaves, which are narrowed at both ends, and callous at the tip. *Bracts* scarious. *Flowers* ¼ in. diam. *Tube of calyx* funnel-shaped. *Capsule* ovoid. *Seeds* minute.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, E. and W. N. America.

8. ARENA'RIA. SANDWORT.

Annual or perennial herbs, often tufted. *Leaves* broad or narrow. *Flowers* white, in dichotomous cymes. *Sepals* 5. *Petals* 5, entire or slightly notched, rarely 0. *Stamens* 10, rarely 5, inserted on the disk. *Disk* annular, or rising into inter-staminal glands. *Ovary* 1-celled; styles 3–4; ovules many, rarely few. *Capsule* short, with as many entire or 2-fid valves as there are styles. *Seeds* compressed, smooth or tubercled; embryo annular.—DISTRIB. all temp. and cold regions; species 130.—ETYM. *Arena*, from many growing in *sand*.

SECTION 1, **Alsi'ne,** *Wahl.* (gen.). *Flowers* hermaphrodite. *Disk* annular. *Capsule* with 3–4 entire valves. *Seeds* many, funicle not swollen or appendaged. (Leaves linear-setaceous in all the British species.)

1. **A. ver'na,** *L.*; densely tufted, leaves crowded subulate, flowering branches slender few-flowered, oblong petals, and capsule longer than the lanceolate sepals.

Dry rocks, pastures and banks, local; ascending to 2,500 ft. in the Highlands; fl. May–July.—Perennial, bright green, sparingly hairy and glandular. *Rootstock* woody; branches 2–4 in., very many, matted, forming a green cushion. *Leaves* ⅛–½ in., 3-nerved. *Bracts* acute, margin scarious. *Flowering branches* 1–4 in., strict. *Flowers* ⅓ in. diam., white; pedicels slender, glandular. *Petals* oblong, hardly longer than the sepals, white.—DISTRIB. Mid. and S. Europe, N. Africa, N. America.

VAR. 1, *ver'na* proper; leaves apiculate, lower not appressed.—VAR. 2, *Gerar'di*, Willd. (sp.?); leaves not apiculate, lower appressed.

2. **A. rubel'la,** *Hook.*; densely tufted, leaves crowded subulate obtuse,

peduncles pubescent 1-flowered, petals lanceolate and capsule shorter than the acute 3-nerved sepals.

Rocky tops of Breadalbane Mts. and Ben Hope, alt. 2,500 to 4,000 ft., very rare; fl. July–Aug.—General character of *A. verna*, but yellow-green and purplish, of laxer habit, smaller in all its parts; leaves more flaccid and obtuse; flowers usually solitary; petals shorter; styles commonly 4; seeds smaller and more orbicular.—DISTRIB. Arctic Europe, Asia, and America.

3. **A. uligino'sa,** *Schleich.;* loosely tufted, stems ascending 1–3-flowered, peduncles slender, leaves subulate semiterete obtuse nerveless, petals obovate-oblong as long as the ovate acute 3-nerved sepals. *Spergula stricta*, Swartz; *Alsine stricta*, Wahl.

Banks of a rill, Widdy-bank Fell, Teesdale, alt. 1,800 ft.; fl. June–July.—Perennial, glabrous, 2–3 in., very slender, habit of *Sagina*. *Leaves* ½–¾ in., curved, upper pairs few and distant. *Peduncles* 1–2 in., filiform. *Flowers* ¼ in. diam., small, white. *Capsule* ovoid. *Seeds* reniform, rugose on the disk.—DISTRIB. W. Europe (Arctic), Lapland to Italy, Greenland.

4. **A. tenuifo'lia,** *L.*; erect, very slender, simple or branched, leaves linear-subulate acute 3–5-nerved, cymes many-flowered, petals oblong not half as long as the lanceolate 3-nerved sepals, capsule 3-valved as long as the sepals.

Sandy fields and waste places from York southwards, chiefly in the Eastern counties; fl. June–Aug.—Annual, 2–8 in. *Leaves* crowded below, upper pairs remote. *Flowers* ¼ in. diam., white. *Petals* obovate-lanceolate.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India.

VAR. 1, *tenuifo'lia* proper; glabrous, stamens 10, capsule equalling the sepals. —VAR. 2, *lax'a*, Jordan (sp.); calyx glandular, stamens 5, capsules longer than the sepals. Great Wilbraham.—VAR. 3, *hybrid'a;* peduncles and sepals glandular, stamens 8–10, capsule hardly longer than the sepals broader at the base. *β, visco'sa*, Bab. Thetford.

SECTION 2. **Arena'ria** proper. *Flowers* hermaphrodite. *Disk* annular. *Capsule* with 3.2-fid valves. *Seeds* many. (Leaves broad in all the British species.)

5. **A. triner'vis,** *L.*; diffuse, leaves petioled ovate acute 3–5-nerved ciliate, flowers solitary, sepals obscurely 3-ribbed, seeds smooth, funicle appendaged. *Mœhringia*, Clairv.

Moist copses, hedgebanks, &c.; fl. May–July.—Annual, branched, flaccid, decumbent, pubescent; branches 4–18 in. *Leaves* ½–1 in. *Flowers* ¼ in. diam., rarely 5-androus; pedicels long, slender. *Sepals* lanceolate, longer than the obovate-lanceolate petals, middle nerve hairy. *Capsule* subglobose, shorter than the sepals.—DISTRIB. Europe (Arctic), Canaries, Siberia, W. Asia, Greenland.

6. **A. serpyllifo'lia,** *L.*; decumbent or suberect, leaves subsessile ovate acuminate rather rigid 1–3-nerved ciliate, cymes many-flowered, bracts foliaceous, sepals with 3–5 hairy ribs, funicle without an appendage.

Wall-tops, &c. abundant, ascends to near 2,000 ft.; fl. June–Aug.—Annual, very variable in habit, grey-green, branched, pubescent, hairs recurved on the stem and peduncles. *Leaves* ¼–⅓ in., very shortly petioled. *Flowers*

⅛ in. diam. *Sepals* with narrow margins, longer than the petals. *Seeds* rough, shining.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya; introd. in the U. States.

VAR. 1, *sphærocar'pa*, Tenore (sp.); rigid, sepals ovate-lanceolate, capsule ovoid its pedicel ascending.—VAR. 2, *Lloyd'ii*, Jord.; shorter, stouter, more glandular, capsule more swollen below. Isle of Wight.—VAR. 3, *leptocla'dos*, Gussone (sp.); weak, sepals lanceolate, capsule narrower its pedicel spreading.

7. **A. cilia'ta**, *L.*; pubescent, procumbent or ascending, leaves oblong-spathulate obtuse 1-nerved ciliate, flowers subsolitary, bracts foliaceous, sepals oblong-lanceolate with 3 hairy ribs much shorter than the petals.

Mountains of Sligo, alt. 1,000–1,700 ft.; fl. June–July.—Perennial, dark green, pubescent with reflexed hairs. *Stems* 3–6 in., numerous, matted, tips ascending. *Leaves* ¼–¾ in., petioled. *Flowers* nearly ½ in. diam. *Sepals* subacute, margins membranous. *Petals* spathulate. *Capsule* ovoid, as long as the sepals. *Funicle* without an appendage.—DISTRIB. Arctic Europe to the Mediterranean and eastwards to Crete.

8. **A. norve'gica**, *Gunner*; procumbent, almost glabrous, leaves fleshy short broadly oblong-spathulate 1-nerved, flowers 1–2, bracts herbaceous, sepals oblong acute with 3 glabrous ribs much shorter than the petals.

Balta Sound, Shetland, and N. Ronaldshay, Orkney; fl. July–Aug.—Habit, &c. of *A. ciliata*, of which it may be an Arctic variety, but succulent, with shorter, closer-set leaves, short peduncles, and broader sepals. *Funicle* without an appendage.—DISTRIB. Norway, Lapland, Finmark, Iceland.

SECTION 3. **Ammode'nia**, *Gmel.* (gen.). *Flowers* polygamous. *Disk* glandular, 10-lobed. *Capsule* fleshy, usually 3-valved. *Seeds* 1–2, large. *Honcken'ya*, Ehr.

9. **A. peploi'des**, *L.*; creeping, fleshy, leaves ovate acute recurved, flowers 1–3 together axillary subsessile, sepals obtuse. *Sea Purslane.*

Sandy and pebbly shores; fl. May–Aug.—Perennial, dark green and glabrous. *Rootstock* creeping; branches 4–8 in., ascending. *Leaves* ½–½ in., decussate, margins cartilaginous. *Flowers* ¼ in. diam., pedicels compressed. *Sepals* with membranous margins. *Petals* of male fl. as long as the sepals, of female shorter. *Stamens* 10, the alternate shorter. *Styles* 3–5. *Capsule* globose. *Seeds* obovoid, concavo-convex.—DISTRIB. Shores of W. Europe from the Arctic regions to Spain, Arctic America.—Used as a pickle in Yorkshire.

SECTION 4. **Cherle'ria**, *L.* (gen.). *Flowers* polygamous. *Sepals* united at the base. *Petals* 0 or minute. *Disk* with 5 glands. *Seeds* few, minute.

10. **A. Cherle'ria**, *Fenzl* (sub. *Alsine*); densely tufted, leaves closely imbricate linear-subulate 3-gonous, flowers solitary, sepals obtuse. *Cyphel.*

Lofty Scotch mountains, alt. 2,500–5,000 ft.; fl. June–Aug.—Perennial, forming mossy, yellow-green cushions, 6–12 in. diam., with a very long tap root. *Leaves* ¼–¾ in., obtuse, ciliate, grooved above. *Flowers* sessile. *Sepals* 3-nerved, margins membranous. *Petals* 0, or in the male fl. subulate. *Glands* large. *Capsule* ovoid, shorter than the sepals. *Seeds* smooth.—DISTRIB. Alps of Central and S. Europe, Pyrenees.

9. SAGI'NA, *L.* PEARL-WORT.

Very small, tufted, annual or perennial herbs. *Leaves* subulate, connate at the base. *Flowers* small, pedicelled. *Sepals* 4–5. *Petals* 4–5, entire, sometimes minute or 0. *Stamens* 4, 5, 8, or 10. *Ovary* 1-celled; styles 4–5, opposite the sepals; ovules many. *Capsule* 4–5-valved to the base.—DISTRIB. Temp. and cold N. and S. hemispheres; species 8.—ETYM. doubtful.

* *Flowers* 4- *rarely* 5-*merous. Petals minute.*

1. **S. apet'ala,** *L.*; annual, primary and lateral branches all flowering, the latter ascending, radical leaves sub-rosulate, petals minute or 0.

Dry banks, wall tops, &c.; fl. May–Aug.—A slender, almost filiform, wiry herb, 4–10 in. *Leaves* ⅛–¼ in., spreading. *Flowers* ⅛ in. diam., green, pedicels capillary.—DISTRIB. Europe, N. Africa, W. Asia; doubtfully indigenous in the U. States.

Sub-sp. APET'ALA proper; branches ascending sparingly glandular-pubescent, leaves ciliate at the base mucronate, pedicels erect, sepals at length spreading obtuse exceeding the capsule.—From Perth and Forfar southwards, rare in Scotland.

Sub-sp. CILIA'TA, Fries (sp.); decumbent, glandular-pubescent, leaves ciliate mucronate, sepals always appressed to the capsule 2 outer mucronate.—Rather rare.

Sub-sp. MARIT'IMA, Don (sp.); decumbent or ascending, glabrous, leaves obtuse or apiculate, sepals suberect in fruit broad obtuse.—VAR. 1, *marit'ima* proper; ascending, slender, internodes long, capsule about equal to the sepals. Sandy sea-shores.—VAR. 2, *deb'ilis,* Jord. (sp.); decumbent, slender, internodes long, capsule a little shorter than the sepals.—VAR. 3, *den'sa.* Jord. (sp.); ascending, slender, internodes short, capsule as in VAR. 2. Cheshunt and Wisbech.—VAR. 4, *alpi'na,* Syme; ascending, stoutish, internodes short, capsule shorter than the sepals. Top of Ben Nevis, *Don.*

2. **S. procum'bens,** *L.*; perennial, stems many, primary shoot flowerless, lateral slender with fascicled branchlets usually procumbent and rooting, sepals spreading in fruit, petals very small.

Waste places, paths, banks, &c.; ascends to 3,800 ft. in the Highlands; fl. May–Sept.—Branches 1–8 in. *Leaves* glabrous or ciliate, obtuse, mucronate, longer than in *S. apetala. Flowers* usually solitary, sometimes 5-merous. *Styles* recurved during flowering. *Capsule* a little longer than the sepals, pedicels erect or curved at the tip.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, Greenland, N. America, Fuegia.

** *Flowers* 5, *rarely* 4-*merous. Petals half as long as the sepals or longer.* (*Perennial, with a leafy flowerless central stem, many lateral flowering branches, minute subulate leaves, and slender erect* 1-*flowered pedicels.* SPERGELLA, *Reich.*)

3. **S. saxat'ilis,** *Wimmer;* stems numerous prostrate and rooting, leaves mucronate, petals longer than the glabrous obtuse sepals, pedicels curved erect in fruit, capsule 5-valved almost twice as long as the usually appressed sepals. *S. Linnæi,* Presl; *Spergula saginoides,* Sm.

Scotch alps north of the Forth and Clyde; ascending to 2,700 ft.; fl. June–Aug.—Distinguishable from the 5-merous forms of *S. procumbens* only by the longer white petals, erect styles and usually longer capsules with

appressed sepals. — DISTRIB. Arctic and Alpine Europe, Siberia, N. America.

4. **S. niva'lis,** *Fries;* densely tufted, glabrous, leaves acuminate, petals rather longer than the broad glabrous obtuse sepals, pedicel always erect, capsule much longer than the appressed sepals.

Ben Lawers, Skye, and Clova Mts.; fl. June–Aug.—Very much more densely tufted than *S. saxatilis*, of which it may be a subspecies with shorter petals, and shorter always erect pedicels.—DISTRIB. Norway, Spitzbergen, Greenland.

5. **S. subula'ta,** *Wimmer;* tufted, more or less glandular and hairy, leaves narrowed to the aristate tip, petals as long as the lanceolate obtuse subglandular sepals, pedicels long slender curved after flowering then erect, capsule rather longer than the appressed sepals. *Spergula*, Swartz.

Heaths, dry pastures, &c.; ascending to 2,700 ft. in the Highlands; N. and W. of Ireland; fl. June–Aug.—This again might be combined with the two preceding.—DISTRIB. Mid. and W. Europe, N. America (doubtfully indigenous, *Gray*).

6. **S. nodo'sa,** *L.*; glabrous or glandular, stems with many leaf-buds in the axils of the rather remote pairs of subulate acute leaves, peduncles short always erect 1–2-flowered, petals and capsules much longer than the oblong obtuse sepals. *Spergula*, L. *Knotted Spurrey.*

Moist heaths, and sandy places; ascending to 1,800 ft. in Yorkshire; fl. July–Aug. — Much the largest and largest-flowered species of the genus. *Branches* 4–10 in., decumbent, curved, wiry. *Radical leaves* ½ in., cauline usually ½–¾ in. *Flowers* ¼ in. diam.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, N. America.

10. SPER'GULA, *L.* SPURREY.

Annual herbs, with forked or fascicled branches. *Leaves* opposite, with abbreviated leaf-buds in their axils, whence the foliage appears whorled; stipules small, scarious. *Flowers* white, in stalked panicled cymes. *Sepals* 5. *Petals* 5, entire. *Stamens* 5 or 10. *Ovary* 1-celled; styles 5; ovules many. *Capsule* with 5 entire valves. *Seeds* compressed, margined or winged; embryo annular.—DISTRIB. Weeds of cultivation in temp. regions; species 2–3.—ETYM. *spargo*, from *scattering* its seeds.

1. **S. arven'sis,** *L.*; leaves linear-subulate ½-terete rather fleshy.

Cornfields, &c.; ascending to 1,000 ft.; fl. June–Aug.—More or less pubescent and glandular. *Stems* 5–18 in., branched from the root, geniculate. *Leaves* ½–1½ in., in distant pairs, grooved beneath. *Flowers* ⅛–¼ in. diam., subumbellate in racemose terminal cymes; peduncles slender, spreading or reflexed. *Sepals* ovate, obtuse, rather shorter than the white petals. *Capsule* subglobose. *Seeds* lenticular, tubercled, keeled, naked or papillose. —DISTRIB. Europe (Arctic), N. Africa, W. Asia to N.W. India; introd. in N. America.

11. SPERGULA'RIA, *Persoon.* SANDWORT-SPURREY.

Diffuse herbs, with the foliage, inflorescence, and stipules of *Spergula*. *Sepals* 5. *Petals* 5, entire, rarely 0, white or red. *Stamens* 10 or fewer.

Ovary 1-celled; styles 3. *Capsule* 3-valved. *Seeds* compressed, often winged; embryo annular or hooked. *Lepigonum*, Fries.—DISTRIB. Temp. and warm regions; often littoral; species 3–4.—ETYM. the diminutive of *Spergula*.

1. **S. ru'bra,** *St. Hilaire;* leaves linear flat, stipules lanceolate cleft, capsule as long as the sepals, seeds plano-convex angular tubercled.

Gravelly and sandy soils; rare in Ireland; fl. June–Sept.—Pubescent and glandular, annual or biennial. *Stem* much branched from the base; branches 4–12 in., spreading, prostrate. *Leaves* ¼–½ in. *Stipules* connate, silvery, torn. *Flowers* ¼ in. diam., solitary or in subracemose cymes; peduncles short, spreading or reflexed, erect in fruit. *Petals* rosy, shorter than the obtuse lanceolate sepals. *Stamens* 5 or 10.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India, N. America.

2. **S. mari'na,** *Cambessedes;* leaves linear ½-terete, stipules deltoid-ovate, capsule longer than the sepals, seeds plano-convex smooth or papillose with or without a membranous wing.

Sandy, muddy and rocky sea-coasts; fl. June–Aug.—A more fleshy species than *S. rubra*, of which it may be ranked as a sub-species, with a generally more woody rootstock and compressed branches. *Flowers* ¼–½ in. diam.—DISTRIB. Europe, N. Africa, W. Asia to India, N. and S. America.

Sub-sp. MARI'NA proper; perennial, glabrous, pedicels shorter than the bracts, flowers large, petals lilac or white as long as the sepals, stamens 10, capsules longer than the sepals, seeds pale-brown papillose, all broadly winged. *L. marinum*, Wahlb. *Arenaria media*, L.

Sub-sp. NEGLEC'TA, *Syme;* annual, pedicels as long as or exceeding the bracts, petals rosy shorter than the sepals white at the base, stamens few, capsule exceeding the sepals, seeds pale-brown almost smooth rarely winged.—VAR. 1, *neglecta* proper; glandular-pubescent, pedicels longer than the scarious bracts, seeds papillose.—VAR. 2, *salina*, Presl (sp.); pedicels equalling the foliaceous bracts, seeds not papillose.—VAR. 3, *media*, Fries (sp.); pedicels shorter than the foliaceous bracts, seeds not papillose.

Sub-sp. RUPES'TRIS, *Lebel* (not of Cambessedes); perennial, glandular-pubescent, pedicels longer than the bracts, petals as long as the sepals rose-purple, stamens 10, capsule equalling the sepals, seeds obovate dark-brown not winged.—Maritime rocks, rare; Isle of Wight, Cornwall, Carnarvonshire.

12. POLYCAR'PON, *L.*

Annual herbs. *Leaves* flat, apparently whorled; stipules scarious. *Flowers* small, in crowded bracteate cymes. *Sepals* 5, keeled, entire. *Petals* 5, small. *Stamens* 3–5. *Style* short, 3-fid; ovules many. *Capsule* 3-valved.—DISTRIB. Various warm and temp. regions; species 6.—ETYM. πόλυς and καρπός, from the *abundant capsules*.

1. **P. tetraphyl'lum,** *L.*; lower leaves in whorls of 4, flowers 3-androus.

Channel Islands, Devon and Dorset, in sandy and waste places; fl. June–July —*Stems* 3–6 in., prostrate. *Leaves* ½ in. obovate, upper opposite. *Flower* ⅛ in. diam.—DISTRIB. Europe, Asia, Africa, &c.

ORDER XIII. PORTULA'CEÆ.

Herbs, rarely small shrubs. *Leaves* opposite or alternate, quite entire; stipules scarious. *Inflorescence* various. *Sepals* 2, imbricate in bud. *Petals* 4

or more, free or united at the base, imbricate in bud. *Stamens* 4 or more, free or adnate to the petals, filaments filiform. *Disk* small or 0. *Ovary* free, 1-celled; style simple or 3-fid, branches stigmatose all over; ovules 2 or more, on long free or connate basal funicles, amphitropal, ascending, micropyle inferior or transverse. *Capsule* dehiscing transversely or 2–3-valved. *Seeds* 1 or more, compressed, hilum marginal; embryo terete, hooked or annular and coiled round the mealy albumen.—DISTRIB. Cosmopolitan, but chiefly American; genera 15; species 125.—AFFINITIES. Close to *Caryophylleæ*, *Ficoideæ*, and *Molluginеæ*.—PROPERTIES. Purslane is a good salad and a potherb.

Petals united at the base. Stamens 3 ..... 1. Montia.
Petals free. Stamens 5 ..... 1*. *Claytonia.*

1. MON'TIA, *L.* BLINKS.

A small, annual, glabrous herb. *Leaves* usually opposite. *Flowers* minute, solitary or few and shortly cymose, white. *Petals* 5, hypogynous, united at the base. *Disk* small, hypogynous. *Stamens* hypogynous, usually 3, opposite and attached to the base of the petals. *Ovary* free; styles short, 3-fid; ovules 3. *Capsule* globose, 3-valved. *Seeds* 1–3, compressed; embryo annular.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, N. America, Arctic and Antarctic regions.—ETYM. J. de Monti, an Italian botanist.

1. **M. fonta'na,** *L.*; leaves spathulate, flowers drooping then erect.

Brooks and marshy grounds; ascends to nearly 3,200 ft. in the Highlands; fl. May–Aug.—Pale-green, 1–5 in., usually flaccid, branched, tufted. *Leaves* ½–¾ in., opposite or nearly so. *Cymes* 1- or few-flowered; flowers $\frac{1}{10}$ in. diam. *Bracts* scarious. *Petals* white, a little longer than the obtuse sepals. *Capsule* obovoid. *Seeds* shining.

VAR. 1, *mi'nor* Gmelin (sp.); stem short, cymes terminal and axillary, tubercles of seed conical.—VAR. 2, *rivula'ris*, Gmelin (sp.); stems elongate flaccid, cymes all axillary, tubercles of seeds flattened.

1*. *CLAYTO'NIA, L.*

Glabrous succulent herbs. *Radical leaves* petioled, cauline alternate and opposite, exstipulate. *Flowers* in terminal cymes. *Petals* 5. *Stamens* 5, opposite and adnate to the bases of the petals. *Ovary* free; style entire or 3-fid at the tip; ovules few. *Capsule* membranous, 3-valved.—DISTRIB. —America, N.W. Asia, Australia; species 20.—ETYM. Dr. J. J. Clayton, an American botanist.

1. C. PERFOLIA'TA, *Don;* radical leaves rhomboid, cauline 2 connate.

A garden outcast, rapidly becoming naturalized in many parts of England; fl. May–July.—Annual, tufted, fleshy, 6–12 in. *Cauline leaves* connate into a suborbicular blade. *Flowers* small, white.—Not in the Lond. Cat., but too frequent to be omitted.—DISTRIB. N.W. America.

ORDER XIV. **PARONY'CHIEÆ.**

Annual or perennial generally small, often tufted herbs. *Leaves* opposite or alternate, quite entire (serrulate and exstipulate in *Scleranthus*); stipules scarious. *Flowers* very small, cymose, regular, 2-sexual. *Sepals* 4–5, free or connate, persistent, closing over the fruit. *Petals*

small or 0. *Stamens* hypogynous or perigynous, filaments short free or connate; anthers small. *Disk* 0 or annular. *Ovary* free, sessile, ovoid, 1-celled; style terminal, 2- rarely 3-fid, stigmas decurrent; ovule 1, erect or pendulous from a basal funicle. *Utricle* or achene enclosed in the perianth, 1-seeded. *Seed* globose reniform or lenticular, testa smooth, hilum frontal or lateral, albumen copious or scanty, floury; embryo straight curved or annular.—DISTRIB. All latitudes, but chiefly warm and dry; genera 17; species 60.—AFFINITIES. Very close to *Caryophylleæ* and *Amaranthaceæ*.—PROPERTIES unimportant.

Leaves alternate. Petals 5. Stigmas 3.....1. Corrigiola.
Leaves when opposite not connate. Sepals green, obtuse .....2. Herniaria.
Leaves opposite. Sepals white, concave with long points.....3. Illecebrum.
Leaves opposite connate at the base.....4. Scleranthus.

1. CORRIGI'OLA, *L.* STRAPWORT.

Annual or perennial prostrate glabrous herbs. *Leaves* alternate, linear or oblong; stipules scarious. *Flowers* minute. *Sepals* 5, connate at the base, obtuse; margins membranous. *Petals* 5, small, white. *Stamens* 5, perigynous. *Ovary* ovoid, style short, 3-partite; ovule suspended from a basal funicle. *Achene* crustaceous, 3-gonous, dotted or rugose. *Testa* membranous; embryo annular.—DISTRIB. Europe, Africa, temp. S. America; species 3–4.—ETYM. The classical name for *Polygonum*, transferred.

1. **C. littora'lis,** *L.*; leaves linear-lanceolate, stipules ½-sagittate.

Sandy places, Helstone, Cornwall; Slapton sands near Start Point; fl. July–Sept.—Annual. *Stems* many from the root, 4–8 in., slender, prostrate or ascending. *Leaves* ⅓–½ in., narrowed into an obscure petiole; stipules small. *Flowers* in crowded terminal cymes. *Petals* as long as the sepals.—DISTRIB. Europe from Denmark southwards.

2. HERNIA'RIA, *L.* RUPTUREWORT.

Annual or perennial prostrate herbs. *Leaves* opposite and alternate, narrow. *Flowers* minute, green, crowded, axil large, 1–2-sexual. *Sepals* 4–5, connate at the base, obtuse, equal or unequal. *Petals* 4–5, setaceous, minute or 0. *Stamens* 3–5, inserted on an annular disk. *Ovary* ovoid; style 2-fid or -partite; ovule erect. *Utricle* indehiscent. *Seed* subglobose or reniform, testa crustaceous shining; embryo annular.—DISTRIB. Europe, N. and S. Africa, W. Asia.—ETYM. the classical name.

1. **H. gla'bra,** *L.*; leaves oblong glabrous or ciliate.

Sandy soils, rare, Lincoln, Norfolk, Suffolk, Cambridge; fl. July–Aug.—*Root* woody, often perennial. *Stems* 4–6 in., many, prostrate, tufted, glabrous or slightly pubescent. *Leaves* ⅛–¼ in.—DISTRIB. Europe, Siberia, W. Asia.—Probably a *var.* of *H. hirsuta*, L., a more southern and eastern plant.

VAR. *ciliata*, Bab. (sp.); perennial, stouter, forming larger tufts, leaves broader, stipules larger whiter. Lizard Point, Guernsey. Syme remarks that this var. keeps its green colour during the winter of Middlesex, which *H. glabra* proper does not.

3. ILLECE'BRUM, *L.*

A small diffuse glabrous annual herb. *Leaves* opposite. *Flowers* minute, white, crowded in all the axils, 1–2-sexual. *Sepals* 5, white, corky, com-

pressed laterally, keeled, ending in a subulate process. *Petals* 5, setaceous, very minute. *Stamens* 5, hypogynous. *Ovary* ovoid; style very short, stigmas 2 capitate; ovule erect. *Utricle* 5–10-fissured at the base, included in the hardened calyx. *Seed* oblong; embryo curved, lateral.—DISTRIB. Europe from Denmark southwards, N. Africa.—ETYM. doubtful.

1. **I. verticilla'tum,** *L.*; leaves ovate-oblong or spathulate.

Sandy bogs, Devon and Cornwall; fl. July–Aug.—Branched from the root, very slender, prostrate; branches 4–8 in., ascending, covered throughout with leaves and tufts of white flowers. *Leaves* ⅛–¼ in. *Flowers* subsessile, shorter than the leaves. *Sepals* opaque.

4. SCLERAN'THUS, *L.* KNAWEL.

Small, low, tufted, annual or perennial herbs. *Leaves* opposite, connate, subulate, pungent, often serrulate; stipules 0. *Flowers* minute, green, in axillary and terminal cymes or fascicles. *Calyx-tube* funnel-shaped or urceolate, hardening over the fruit; lobes 4–5, short, erect. *Petals* 0. *Stamens* 1, 2, 5, or 10, inserted on the calyx-mouth. *Ovary* ovoid; styles 2, filiform stigmas capitate; ovule pendulous from a filiform basal funicle. *Utricle* indehiscent. *Seed* lenticular, testa smooth; embryo annular.—DISTRIB. Europe, E. Asia, Africa, Australia, New Zealand.—ETYM. *σκληρός*, from the *indurated* perianth.

1. **S. an'nuus,** *L.*; calyx-lobes suberect in fruit acute with narrow membranous margin.

Fields and waste places, ascends above 1,000 ft. in Highlands; fl. June–Sept. —*Stem* 2–8 in., slender, green, sometimes puberulous. *Leaves* ½–½ in., recurved, often ciliate towards the base. *Flowers* solitary in the lower axils, and fascicled in dichotomous cymes at the ends of the branches. *Calyx-tube* 10-grooved in fruit.—DISTRIB. Europe to the Caucasus, N. Africa, Siberia, W. Asia; introd. in U. States.

VAR. 1, *annuus* proper; annual, diffusely branched, internodes long, calyx-lobes as long as the tube or longer, furrows of fruiting-tube deep.—VAR. 2, *biennis,* Reuter (sp.); biennial, stem shorter 2–3 in. suberect, internodes short, leaves and flowers smaller, calyx-lobes shorter, furrows on tube shallower.

2. **S. peren'nis,** *L.*; calyx-lobes incurved obtuse with broad scarious margins.

Sandy fields, Radnor, and on the borders of Norfolk and Suffolk; fl. June–Aug.—Very similar to *S. annuus,* and perhaps only a sub-species, but more glaucous, with shorter bracts and pubescent calyx-tube.—DISTRIB. Europe to the Caucasus, Siberia.

ORDER XIV*. TAMARISCI'NEÆ.

Shrubs or small trees. *Leaves* very small, often scale-like, imbricate, amplexicaul, exstipulate. *Inflorescence* of solitary or panicled axillary spikes. *Sepals* 5, rarely 4, imbricate in bud. *Petals* 5, rarely 4, free or connate below, imbricate in bud. *Stamens* 4, 5, 8 or 10 inserted on the disk, free or connate below; anthers versatile. *Disk* hypogynous or slightly perigynous, 10-glandular. *Ovary* free, 1- or imperfectly 2–5-celled; styles

3–5, free or connate, or 3–5 sessile stigmas; ovules 2 or more, on basal placentas, erect, anatropous, raphe ventral, micropyle superior. *Capsule* 3–5-valved. *Seeds* erect, usually more or less comose or winged, albumen fleshy farinaceous or 0; embryo straight, cotyledons flat.—DISTRIB. Cold, temp. and hot regions, often in sandy or saline places; genera 5; species 40.—AFFINITIES. With *Caryophylleæ*, *Portulaceæ*, and *Frankeniaceæ*.—PROPERTIES. *Tamarix* yields manna and galls, and its ashes soda.

TAM'ARIX, *L.* TAMARISK.

Sepals 4–5, free. *Petals* 4–5, free or united at the base. *Stamens* 4, 5, 8, or 10. *Ovary* narrowed upwards; styles 3–4, short, thick; ovules many. *Capsule* 3-valved. *Seeds* many, with a lateral and terminal pencil of hairs, albumen 0; embryo ovoid.—DISTRIB. Of the Order; species 20.—ETYM. The Tamaris, a river of Spain where Tamarisk abounds.

T. GALL'ICA, *L.*; glabrous, disk acutely 5-angled. *T. anglica*, Webb.

S. and E. coasts of England, where planted only; an alien, *Watson;* fl. July–Sept.—An evergreen shrub or small tree, 5–10 ft. *Branchlets* excessively slender and feathery. *Leaves* on the branchlets extremely minute, closely imbricate, triangular, auricled, keeled; on the older wood much larger, ⅛ in., subulate. *Flowers* ⅛ in. diam., white or pink, in catkin-like obtuse spikes, 1 in. *Sepals* lanceolate. *Petals* persistent. *Anthers* apiculate. *Capsule* 3-gonous.—DISTRIB. Shores of Atlantic and Mediterranean, W. Asia to N.W. India.

ORDER XV. ELAT'INEÆ.

Herbs, often minute, or under-shrubs. *Leaves* opposite or whorled, entire or serrate, stipulate. *Flowers* small, axillary, solitary or cymose. *Sepals* and *petals* each 2–5, free, imbricate in bud. *Stamens* 2–5, or twice as many, hypogynous, free; anthers versatile. *Ovary* free, cells and styles 2–5; stigmas capitate; ovules many, on the inner angles of the cells, anatropous, raphe lateral or ventral. *Capsule* septicidal; valves flat concave or inflexed, separating from the axis and septa. *Seeds* straight or curved; raphe on the concave side, testa often rugose, albumen scanty or 0; embryo cylindric, straight or curved, cotyledons small.—DISTRIB. Scattered over the globe; genera 2; species 20.—AFFINITIES. With *Caryophylleæ* and *Hypericineæ*.—PROPERTIES. Supposed to be acrid.

1. ELAT'INE, *L.* WATERWORT.

Very small, aquatic, creeping, glabrous herbs. *Leaves* spathulate. *Flowers* minute, axillary. *Sepals* 2–4, membranous. *Petals* 2–4. *Ovary* globose. *Capsule* membranous; septa evanescent after bursting, or adhering to the axis. *Seed* cylindric, straight or curved, ridged and pitted.—DISTRIB. Temp. and sub-trop. regions; species 6.—ETYM. obscure.

1. **E. hexan'dra,** *DC.*; flowers pedicelled 3-merous, capsule turbinate, seeds 8–12 in each cell straight ascending. *E. tripetala*, Sm.

Margins of ponds and lakes, rare, from Perth southwards; N. and W. Ireland; fl. July–Sept.—*Stems* 1–3 in., matted, flaccid, rooting at the nodes. *Leaves* ⅛–⅓ in., spathulate. *Flowers* $\frac{1}{16}$ in. diam., alternate, axillary. *Sepals*

unequal. *Petals* pink, longer than the sepals.—DISTRIB. Europe, from Holland southwards to Lombardy and Hungary (excl. Spain), Azores.

2. **E. Hydropi'per,** *L.*; flowers sessile 4-merous, capsule subglobose, seeds 4 in each cell hooked pendulous.

Muddy ponds, very rare, Trencham pond, Farnham; Llyn-Cwm, Anglesea; Lough Neagh, and Lagan Canal, Ireland; fl. July–Aug.—Extremely similar in general appearance to *E. hexandra.*—DISTRIB. Europe to S. Russia (excl. Spain, Greece, Turkey, and Denmark).

ORDER XVI. HYPERICI'NEÆ.

Herbs, shrubs, or trees. *Leaves* opposite, often covered with pellucid glands, entire or glandular-toothed, exstipulate. *Flowers* terminal, cymose, rarely axillary. *Sepals* 5, rarely 4, imbricate in bud. *Petals* as many, hypogynous, usually twisted in bud. *Stamens* many, rarely few, united in bundles; anthers versatile. *Disk* obscure or of interstaminal glands. *Ovary* of 3–5 carpels, 1- or 3–5-celled; styles as many, filiform, stigmas terminal; ovules few or many, on parietal or axile placentas, anatropous, raphe lateral or superior. *Fruit* a septicidal capsule, rarely a berry. *Seeds* exalbuminous; embryo straight or curved.—DISTRIB. Temp. and mountains of warm regions; genera 8; species 210.—AFFINITIES. Close with *Guttiferæ* and *Ternstræmiaceæ*, less close with *Elatineæ.*—PROPERTIES. Drastic purgatives, astringents, and tonics.

1. HYPER'ICUM, *L.* ST. JOHN'S WORT.

Herbs, shrubs, or small trees. *Leaves* sessile, often gland-dotted. *Flowers* cymose, yellow. *Sepals* 5. *Petals* 5, generally very oblique. *Ovary* 1-celled with 3 or 5 parietal, or 3–5-celled with axile placentas; styles distinct or combined; ovules many in the cells, rarely few. *Capsule* septicidal, placentas adhering to the edges of the valves or to the axis. *Seeds* oblong; embryo straight or incurved.—DISTRIB. All temp. regions; species 160.—ETYM. obscure.

SECTION 1. *Sepals* 5, unequal. *Petals* deciduous. *Stamens* cohering in 5 bundles at the very base only, without intervening glands. *Ovary* incompletly 3- or 5-celled.

1. **H. Androsæ'mum,** *L.*; shrubby, leaves ovate subcordate, cymes corymbose few-flowered, petals very oblique, styles 3 recurved. *Tutsan.*

Hedges and thickets, from Ross southwards; fl. June–Aug.—Glabrous. *Stem* 1–2 ft., compressed, 4-angled. *Leaves* 1–3 in., obtuse or acute, glands very minute, close. *Flowers* ½–¾ in. diam. *Sepals* obtuse, glandular, but not on the margins, about as long as the petals and stamens. *Berry* globose, black, incompletely 3-celled.—DISTRIB. Mid. and S. Europe, N. Africa, W. Asia.

H. CALYCI'NUM, *L.*; shrubby, leaves sessile oblong obtuse, flowers subsolitary, styles 5 straight.

Hedges and thickets, in various places, undoubtedly naturalized; fl. July–Sept.—Glabrous, extensively creeping. *Stem* 10–16 in., subsimple, compressed, 4-angled. *Leaves* 2–4 in., coriaceous, glands rather large, scattered. *Flowers* 3–4 in. broad, shortly peduncled. *Outer sepals* orbicular,

half as long as the petals. *Capsule* ovoid, 5-celled towards the base.—DISTRIB. S.E. Europe.

SECTION 2. *Sepals* 5, connate at the base. *Petals* persistent. *Stamens* cohering in 3 bundles at the very base only, without intervening glands. *Ovary* completely 3-celled. *Capsule* septicidal.

* *Margins of sepals entire or toothed, eglandular.*

2. **H. perfora'tum,** *L.*; stem erect with 2 ridges, leaves oblong obtuse with pellucid glands, secondary nerves opaque, sepals erect lanceolate.

Woods, copses, and hedgebanks; ascends to near 1,000 ft. in Yorkshire; fl. July–Sept.—Glabrous. *Stems* 1–3 ft., branched above, slender, strict, light brown. *Leaves* ¾–1 in., obtuse; glands black. *Cymes* corymbose, many-flowered. *Flowers* 1 in. diam. *Sepals* acute, entire or slightly serrate. *Petals* much longer. *Capsule* transversely wrinkled; valves with 2 glandular lines on the back.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya; introd. in U. States.

3. **H. quadrang'ulum,** *L.*; stem erect with 4 lines or ridges above, leaves ovate-oblong, cauline subamplexicaul with pellucid glands, primary and secondary nerves transparent.

Copses and moist places; fl. July–Sept.—Very variable, habit of *H. perforatum.*—DISTRIB. Europe (Arctic) to the Caucasus (excl. Turkey), N. Africa, Siberia, W. Asia.

Sub-sp. DU'BIUM, *Leers* (sp.); leaves with few pellucid glands, sepals patent and recurved with black glands on the back, petals oblong obtuse quite entire, style as long as the capsule.—VAR. *macula'tum,* Bab.; sepals oblong-lanceolate acute slightly toothed.

Sub-sp. 2. TETRAP'TERUM, *Fries* (sp.); leaves with many pellucid glands, sepals erect lanceolate acuminate quite entire, styles half as long as the capsule.—Ascends to 1,200 ft. in Yorkshire.

Sub-sp. 3. UNDULA'TUM, *Schousb.* (sp.); leaves with many pellucid glands and black glands beneath, sepals ovate-lanceolate acuminate often crenate, styles not half as long as the capsule. *H. baticum,* Boiss.—Bogs, Plymouth and Cornwall.

4. **H. humifu'sum,** *L.*; stems many procumbent with 2 raised lines, leaves oblong without pellucid glands, margins often revolute with black glands, cymes forked, sepals unequal.

Roadsides, commons, &c.; ascends to near 1,000 ft. in Yorkshire; fl. July–Aug.—Perennial, glabrous. *Branches* 4–10 in., very many, compressed, curving upwards, leafy. *Leaves* ⅛–⅓ in. *Flower* ⅓–½ in. diam.—DISTRIB. Europe from Denmark southwards (excl. Turkey), Canaries, and Azores.

** *Margins of sepals with glandular teeth.*

5. **H. linarifo'lium,** *Vahl;* stems ascending terete, leaves linear obtuse, margins revolute, sepals lanceolate acute. *H. lincarifolium,* DC., &c.

Rocky banks, Cape Cornwall, and on the Teign, Tamar and Tavey, Devon; Channel Is.; fl. June–July.—*Stems* 6–15 in., many from the roots, leafy. *Leaves* ½–1 in. *Cymes* few-flowered. *Flowers* ½ in. diam. *Petals* twice as long as the sepals, with black marginal glands. *Stamens* few. *Styles* short.—DISTRIB. S.W. and S. Europe, Canaries.—Syme finds in Jersey the *H. decumbens* (Petermann) growing with this, intermediate between it and *H. humifusum.*

6. **H. pul'chrum,** *L.* ; glabrous, stems erect slender terete branched above, leaves cordate very obtuse, upper oblong, all with pellucid glands, sepals small oblong.

Dry copses, heaths, and commons ; ascending to 2,200 ft. in the Highlands ; fl. June–July.—Very elegant. *Stems* 1–2 ft., flexuous. *Cymes* panicled, many-flowered. *Leaves* ½ in. *Flower* ½–¾ in. diam. *Petals* twice as long as the sepals, yellow, tinged with red, margins with black glands. *Anthers* red. *Styles* short.—DISTRIB. Europe (Arctic), eastwards to Lithuania and Turkey.

7. **H. hirsu'tum,** *L.*; finely pubescent, stem erect terete subsimple, leaves very shortly petioled ovate or oblong obtuse with pellucid glands, sepals linear-oblong subacute.

Copses, &c. ; ascends to 1,300 ft. in Yorkshire ; very rare in Ireland ; fl. July–Aug.—Rather stout, 1–3 ft., leafy ; pubescence curly. *Leaves* 1–2 in., without marginal glands. *Cymes* panicled. *Flowers* ¾ in. diam., pale yellow. *Petals* twice as long as the sepals.—DISTRIB. Europe, Siberia, W. Asia.

8. **H. monta'num,** *L.*; almost glabrous, stem ascending terete, leaves sessile oblong obtuse, upper cordate-ovate or linear-oblong puberulous beneath, margin with black glands, sepals lanceolate acute.

Copses in gravelly or chalky soil, England and N.E. of Ireland ; not ascending above 600 ft. ; fl. July–Aug.—*Stem* 1–2 ft. rigid, very slender, often leafless above. *Leaves* 1–2 in., membranous. *Cymes* few and dense-flowered ; bracts glandular, toothed. *Flowers* ½–¾ in. diam., pale yellow. *Petals* eglandular or nearly so, twice as long as the sepals.—DISTRIB. Europe to the Caucasus, N. Africa.

SECTION 3. *Sepals* nearly equal. *Petals* not oblique, persistent. *Stamens* 15, cohering ⅓ way up in 3 stalked bundles which alternate with 2-fid hypogynous scales. *Ovary* incompletely 3-celled.

9. **H. elo'des,** *L.*; villous, leaves orbicular or oblong-cordate.

Bogs, ditches, and wet moors, S. of England, W. of Scotland, all Ireland ; fl. July–Aug.—*Stems* 3–18 in., many, creeping, terete. *Leaves* ½–1 in., ½-amplexicaul, pellucid glands small. *Cymes* irregular, often spuriously axillary, 3-chotomous ; bracts small, deltoid, gland-serrated. *Flowers* ½ in. diam., pale-yellow. *Sepals* glabrous, oblong, obtuse, with red glandular serratures. —DISTRIB. W. Europe, from Holland to Spain and Austria ; Azores.

ORDER XVII. MALVA'CEÆ.

Herbs, shrubs, or trees, hairs often stellate. *Leaves* alternate, 3- or more-nerved at the base ; stipules deciduous. *Inflorescence* various ; bracteoles 3–9, rarely 0, free, or connate and forming an involucel. *Calyx* 5-lobed, valvate in bud. *Petals* 5, adnate at the base to the staminal column, twisted in bud, often oblique. *Stamens* many, filaments combined into a tube variously split at the top into antheriferous lobes ; anthers reniform annular linear or twisted, 1-celled, bursting outwards. *Disk* small, often produced upwards between the carpels. *Carpels* many, whorled, free or connate ; styles free or united, stigmatose on the inner face, or top ; ovules

1 or more on the inner angles of the carpels, usually horizontal or ascending, raphe ventral or superior. *Fruit* usually of many dry indehiscent or 2-valved loculicidal crustaceous or coriaceous 1- or more-seeded carpels. *Seed* often woolly, albumen little or 0; embryo straight or curved, cotyledons usually thin folded or plaited.—DISTRIB. All regions but very cold ones; genera 60; species 700.—AFFINITIES. With *Sterculiaceæ* and *Tiliaceæ*, also with *Euphorbiaceæ*.—PROPERTIES. Mucilaginous; the bark yields textiles, and cotton is the covering of the seeds of *Gossypium*.

Bracteoles 6–9, connate at the base.....1. Althæa.
Bracteoles 3, free, inserted on the calyx.....2. Malva.
Bracteoles 3, connate at the base.....3. Lavatera.

1. ALTHÆ'A, *L.* MARSH-MALLOW.

Herbs, hairy or tomentose. *Leaves* lobed or divided. *Flowers* axillary or racemose. *Calyx* 5-fid; involucel 6–9-fid. *Staminal column* long, filaments free at the top only. *Ovary* many-celled; styles filiform, inner surface stigmatose; ovules 1 in each cell. *Fruit* a whorl of indehiscent 1-seeded carpels. *Seed* ascending.—DISTRIB. Temp. and warm regions; species 12.—ETYM. ἄλθω, from its *healing* properties.

1. **A. officina'lis,** *L.*; softly pubescent, cymes axillary shorter than the leaves. *Marsh-mallow, Guimauve.*

Marshes near the sea, local; from Lincoln and S. Wales southwards, and in Ireland; Scotland, introduced only; fl. Aug.–Sept.—Perennial. *Stem* 2–3 ft., subsimple. *Leaves* 2–3 in. broad, shortly petioled, ovate-cordate or suborbicular, thick, entire or 3–5-lobed, toothed. *Flowers* 1–2 in. diam., rosy. *Sepals* ovate.—DISTRIB. Europe from Denmark southwards, N. Africa, Siberia, W. Asia; introd. in N. America.

A. HIRSU'TA, *L.*; hispid, peduncles 1-flowered longer than the leaves.

Naturalized in fields N. of Cuxton Church, Kent; fl. July–Aug.—Annual or biennial. *Stems* 6–18 in., many, ascending, slender. *Leaves* long-petioled, reniform, acutely 5-lobed, crenate, upper 3-partite. *Flowers* 1 in. diam., rose-purple. *Sepals* lanceolate.—DISTRIB. Europe from Belgium southwards.

2. MAL'VA, *L.* MALLOW.

Hirsute or glabrous herbs. *Leaves* angled, lobed or cut. *Flowers* axillary. *Calyx* 5-fid, 3-bracteolate. *Staminal column* long, filaments free at its top only; anthers reniform, 2-celled in bud, 2-valved dehiscing along the convex side; pollen globose, hispid. *Ovary* many-celled; styles stigmatose on the inner surface. *Fruit* a whorl of indehiscent 1-seeded carpels separating from a short conical axis. *Seed* ascending, albumen scanty mucilaginous.—DISTRIB. Europe, temp. Asia and N. Africa, and as weeds of cultivation in other regions; species 16.—ETYM. μαλάχη, in allusion to its *emollient* properties.

1. **M. sylves'tris,** *L.*; hairy, stems many ascending, leaves 3–7-lobed crenate-serrate, peduncles spreading, carpels glabrous reticulate.

Waste places from Isla southwards, rare, if native (*Watson*), in Scotland; fl. June–Sept.—Perennial or biennial, 2–3 ft. *Leaves* 2–3 in. diam., lobes

shallow acute. *Flowers* 1–1½ in. diam., irregularly fascicled, pale purple or blue, pedicels slender.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in U. States.

2. **M. rotundifo'lia,** *L.*; pubescent, stems many decumbent, leaves reniform obscurely lobed crenate, peduncles decurved, carpels pubescent smooth edges rounded.

Waste places from Aberdeen southwards; rarer in Scotland and Ireland; fl. June–Sept.—Perennial. *Stems* 6 in.–2 ft. *Leaves* ½–1½ in. broad, often serrate. *Flowers* ¾–1 in. diam., irregularly fascicled, pale lilac or whitish. —DISTRIB. Europe, N. Africa, Siberia, W. Asia to India; introd. in U. States.

3. **M. moscha'ta,** *L.*; hairy, stem erect, leaves 5–7-partite lobes pinnatifid, peduncles erect in fruit, carpels smooth hispid on the rounded back.

Meadows, &c. in a dry soil; from an alien? in Mid. Scotland, *Watson;* rare in Ireland; fl. July–Aug.—Perennial.—*Stem* 2–3 ft., often purple-spotted. *Leaves* 1–3 in. diam., long-petioled. *Flowers* 1–2 in. diam., rosy, rarely white.—DISTRIB. Europe, eastward to Lithuania; introd. in the U. States.

3. LAVATE'RA, *L.* TREE-MALLOW.

Tall, hirsute or tomentose herbs or shrubs. *Leaves* angled or lobed. *Flowers* axillary. *Calyx* 5-fid; involucel 3-fid. *Staminal column* long, filaments free at its top only. *Ovary* many-celled; styles filiform, as many as the cells, inner surface stigmatose; ovules 1 in each cell. *Fruit* a depressed whorl of indehiscent 1-seeded carpels, separating from the axis. *Seed* ascending.—DISTRIB. Europe, W. Asia, N. Africa, and 1 Australian; species 18.—ETYM. The brothers Lavater, Swiss physicians.

1. **L. arbo'rea,** *L.*; leaves suborbicular 5–9-lobed plaited crenate.

Maritime rocks, England, and Scotland south of Firth of Clyde; rare in Ireland; fl. July–Sept.—Biennial, softly pubescent. *Stem* 3–6 ft., very stout, erect. *Leaves* long-petioled; lobes broad, short, upper more entire. *Peduncles* crowded, axillary, 1-flowered, shorter than the petioles. *Flowers* 1½ in. diam., purple, glossy. *Involucel* with 3 very large ovate lobes. *Sepals* deltoid. *Carpels* wrinkled.—DISTRIB. Coasts of France, and eastwards to Greece.

ORDER XVIII. TILIA'CEÆ.

Trees or shrubs, rarely herbs. *Leaves* alternate, entire or toothed, stipulate. *Flowers* cymose; cymes usually corymbose or panicled. *Sepals* 5, free or connate below, valvate in bud. *Petals* 5 or fewer or 0, æstivation various. *Stamens* many, inserted on the disk, filaments filiform free or united in bundles; anthers 2-celled, opening by pores or valves.—*Disk* tumid. *Ovary* free, 2–10-celled; styles entire or divided, or stigma sessile; ovules 1 or more, in the inner angle of the cells, anatropous, usually pendulous with the raphe ventral. *Fruit* 1–12-celled, dry or baccate, indehiscent or loculicidal. *Seeds* various, albumen fleshy; embryo straight with foliaceous cotyledons.—DISTRIB. Chiefly tropical; genera 40; species 330.—AFFINITIES with *Sterculiaceæ* and *Malvaceæ*.—PROPERTIES usually mucilaginous, liber of many species yields fibre.

1. TIL'IA, *L.* LIME-TREE or LINDEN.

Trees with simple or stellate hairs. *Leaves* oblique, cordate, serrate. *Cymes* axillary or terminal; bract leafy, adnate to the peduncle. *Sepals* 5. *Petals* 5, with often a scale at the base. *Stamens* many, filaments free or united into bundles at the base. *Ovary* 5-celled; style simple, stigma 5-toothed. *Fruit* globose, indehiscent, 1–2-seeded. *Seeds* ascending; cotyledons broad, crumpled, with involute margins.—DISTRIB. Europe, N. Asia, N. America; species 8.—ETYM. The old Latin name.

1. **T. parvifo'lia,** *L.*; glabrous, leaves pubescent in the axils of the nerves beneath, fruit crustaceous pubescent.

Woods from Yorkshire southwards; a doubtful native, *Watson;* indigenous, *Borrer;* fl. July–Aug.—A small tree. *Leaves* 1½–2½ in. diam., ovate-cordate, acuminate, finely serrate, glaucous and glabrous beneath, upper obscurely lobed. *Flowers* ½ in. diam. *Fruit* about ¼ in. diam., faintly ribbed.—DISTRIB. Europe (excl. Greece and Turkey) and Siberia.—This is probably the English wild form of the continental *T. europæa.*

T. INTERME'DIA, *DC.*; glabrous, leaves pubescent in the axils of the nerves beneath, fruit woody pubescent not ribbed when ripe. *Common Lime.*

Woods and hedges, not indigenous; fl. June–July.—This is probably a sub-species of *T. europæa,* L., which should include all the rest.

T. GRANDIFO'LIA, *Ehrhart;* twigs pilose, leaves downy beneath, fruit obovate-globose with 3–5 prominent ribs when ripe. *Large-leaved Lime.*

Woods and hedges; a denizen? *Watson;* fl. June–July.—A tree 70–90 ft. high, differing very little in foliage and floral characters from *T. parvifolia.*—DISTRIB. Europe from Denmark southwards.

VAR. *corallina,* bark of young branches reddish brown.

ORDER XIX. LINE'Æ.

Herbs, shrubs, or trees. *Leaves* alternate, rarely opposite, simple, entire, sometimes stipulate. *Inflorescence* cymose. *Sepals* 4–5, free or connate, imbricate in bud. *Petals* 4–5, hypogynous, imbricate or twisted in bud. *Stamens* 4–5, with alternating staminodes or 10 with the filaments inserted on a hypogynous ring; anthers versatile. *Disk* 0 or glandular. *Ovary* free, 3–5-celled; styles 3–5, stigmas terminal; ovules 1–2 in each cell, pendulous, raphe ventral, micropyle superior. *Capsule* septicidally splitting into 2-valved cocci. *Seeds* compressed, albumen fleshy; embryo nearly as long as the seed, cotyledons plano-convex.—DISTRIB. All regions; genera 14; species 135.—AFFINITIES, slightly with *Malvaceæ* and *Geraniaceæ;* more close with *Malpighiaceæ* and *Ternstræmiaceæ.*—PROPERTIES. Mucilaginous, oily, diuretic; seeds occasionally purgative; bark fibrous (as in flax).

Sepals 5, quite entire ..... 1. Linum.
Sepals 4, 2–4-toothed ..... 2. Radiola.

1. LI'NUM, *L.* FLAX.

Herbs or small shrubs. *Leaves* alternate, rarely opposite, narrow, quite entire; stipules 0 or glandular. *Flowers* in dichotomous, panicled, race-

mose or fascicled cymes. *Sepals* 5, entire. *Petals* 5, fugacious. *Stamens* 5, hypogynous, united at the base, alternating with 5 minute staminodes. *Disk* of 5 glands opposite the petals. *Ovary* 5-celled, cells sometimes divided into 2; styles 5; ovules 2 in each principal cell. *Cocci* 5, 1- or partially 2-celled, 2-seeded. *Albumen* scanty; embryo straight.—DISTRIB. Temp. and warm regions; species 80.—ETYM. The classical name.

1. **L. cathar'ticum,** *L.*; annual, small, leaves opposite, upper alternate, buds nodding, petals free. *Purging Flax.*

Heaths and pastures; ascends to 2,400 ft. in the Highlands; fl. June–Sept.—Glabrous, glaucous, 2–10 in., very slender. *Leaves* linear-oblong. *Flowers* ⅛–¼ in. diam., white. *Petals* oblong, acute or obtuse.—DISTRIB. Europe (Arctic), Canaries, W. Asia to Persia.

2. **L. peren'ne,** *L.*; perennial, leaves alternate narrow linear-lanceolate acute, sepals obovate obtuse glabrous 3–5-nerved, petals free.

Chalky soils, rather rare, from Durham to Essex; fl. June–July.—Glabrous. *Stems* many, 1–2 ft., wiry, very slender. *Leaves* ½–¾ in. *Cymes* few-flowered, racemose. *Flowers* 1 in. broad, bright blue. *Sepals* obovate, 3 inner broader, quite entire.—DISTRIB. Mid. and S. Europe, W. Asia to India.

3. **L. angustifo'lium,** *L.*; annual or perennial, leaves alternate narrow linear-lanceolate, outer sepals ovate acuminate, inner ciliate 3-nerved.

From Lancashire southwards; Ireland rare; fl. May–Sept.—Glabrous, glaucous. *Stems* 1–2 ft.; branches few, divaricate. *Leaves* as in *L. perenne*, but fewer and smaller. *Cymes* few-flowered. *Flowers* ½–¾ in. diam., pale lilac-blue.—DISTRIB. W. and S. Europe, from France to Greece, N. Africa, W. Asia.

L. USITATIS'SIMUM, *L.*; annual, leaves alternate linear-lanceolate, sepals ovate acuminate ciliate 3-nerved, petals crenulate. *Common Flax.*

An escape of flax-fields; fl. June–July.—Larger than any of the preceding. *Stem* solitary, corymbosely branched above. *Cymes* broad, many-flowered.—DISTRIB. Wherever flax is cultivated for oil or fibre.

2. RADI'OLA, *Gmelin.* ALL-SEED.

A minute, annual herb, with filiform many times forked branches. *Leaves* opposite, exstipulate. *Flowers* in corymbose cymes. *Sepals* 4, 2–4-toothed. *Petals* 4, fugacious. *Stamens* 4, nearly free, with minute staminodes or 0. *Disk* glands inconspicuous. *Ovary* 4-celled; cells divided into 2; styles 4; ovules 2 in each cell. *Capsule* of 4 nearly 2-celled 2-seeded divisible cocci. *Seeds* exalbuminous.—DISTRIB. Europe, N. Africa, W. Asia.—ETYM. *radius*, from the *rayed* ramification.

1. **R. Millegra'na,** *Sm.*; leaves ovate acute 3–5-nerved.

Gravelly and sandy damp places, uncommon, but widely diffused from the Orkneys to Cornwall, and in Ireland; fl. July–Aug.—*Stem* 1–4 in. *Leaves* ⅛–⅜ in., sessile, rather succulent. *Flowers* axillary and in the forks, most minute; peduncles short, erect. *Sepals* united below, as long as the oblong petals.

ORDER XX. GERANIA'CEÆ (including OXALI'DEÆ and BALSAMI'NEÆ).

Herbs, rarely shrubby. *Leaves* opposite or alternate, usually stipulate. *Inflorescence* various; flowers regular or irregular. *Sepals* 5 or fewer, imbricate or valvate in bud. *Petals* 3–5, imbricate in bud. *Stamens* usually 5 in irregular flowers, and 10 in the regular, some often deformed. *Disk* inconspicuous or glandular. *Ovary* 3–5-lobed, 3–5-celled, produced upwards into a styliferous beak, or with one or more terminal styles; ovules 1–2 or many in each cell, anatropous, pendulous, raphe ventral. *Fruit* septicidal or loculicidal, or separating into cocci. *Seeds* small, albumen scanty or 0; embryo various.—DISTRIB. Temp. and trop., rarely arctic regions; genera 16; species 750.—AFFINITIES. With *Rutaceæ* and *Lineæ*.—PROPERTIES. Tribe *Geranicæ* are often astringent, aromatic, and abound in volatile oil. *Oxalideæ* abound in oxalic acid, and some have eatable tubers.

TRIBE I. **GERA'NIEÆ.** *Flowers* regular. *Sepals* imbricate. *Stamens* alternating with glands. *Capsule* beaked, of several 1-seeded awned cocci, that separate elastically from the beak.

Stamens 10, all antheriferous ..... 1. Geranium.
Stamens 5, staminodes 5; ..... 2. Erodium.

TRIBE II. **OXALI'DEÆ.** *Flowers* regular. *Sepals* imbricate. *Glands* 0. *Capsule* loculicidal; cells 2- or more-seeded ..... 3. Oxalis.

TRIBE III. **BALSAMI'NEÆ.** *Flowers* irregular. *Sepals* coloured, posticous spurred. *Stamens* 5. *Glands* 0. *Capsule* loculicidal; cells 2- or more-seeded ..... 4. Impatiens.

1. GERA'NIUM, *L.* CRANE'S-BILL.

Herbs, rarely shrubs, with swollen nodes. *Leaves* opposite or alternate, usually cut or lobed, stipulate. *Flowers* regular, on 1–2-flowered axillary peduncles. *Sepals* and *Petals* 5, imbricate in bud. *Stamens* 10, free or connate at the base, hypogynous. *Disk* of 5 glands opposite the sepals. *Ovary* 5-lobed, 5-celled, with a long beak terminated by 5 stigmas; ovules 2 in each cell, superposed. *Fruit* of 5 dehiscent carpels, terminating upwards in long slender tails, which separate elastically from the styliferous and placentiferous axis. *Seeds* solitary in the carpels, albumen scanty or 0; cotyledons plicate or convolute; radicle incumbent.—DISTRIB. All temp. especially littoral and sandy regions; species 100.—ETYM. γέρανος, *a crane*, from the form of the fruit.—The so-called garden Geraniums are *Pelargonia*, having irregular flowers, a spurred sepal, perigynous petals, no glands, and few declinate stamens.

* *Perennial. Peduncles* 1-*flowered. Sepals spreading.*

1. **G. sanguin'eum,** *L.*; pilose, leaves orbicular 5–7-partite, lobes narrow 3–5-fid to the middle, carpels hairy, seeds wrinkled and dotted.

Dry rocky places and on sandy shores; ascends above 1,000 ft. in the Highlands; local in Ireland; fl. July–Aug.—*Rootstock* stout, truncate. *Stems* 1–2 ft., geniculate; hairs spreading. *Leaves* 1–2 in. diam., segments linear-oblong, or lanceolate, obtuse or subacute; stipules ovate, acute. *Flowers* 1–1½ in. diam., crimson or pink; peduncles very long, 2-bracteate in the middle. *Sepals* oblong, obtuse, awned.—DISTRIB. Europe, W. Asia.

VAR. 1, *sanguin'eum* proper; suberect, hairs scattered.—VAR. 2, *prostra'tum*, Cav. (sp.); stems decumbent shorter, hairs more copious, flowers pinkish. *G. lancastriense*, With.

** *Perennial. Stem erect. Peduncles 2-flowered. Sepals spreading.*

2. **G. sylvat'icum,** *L.*; erect, pilose and glandular above, leaves orbicular deeply 7-lobed, lobes cut and serrate, sepals awned, petals notched, capsules smooth hairy, pedicels erect, seeds minutely reticulate.

Copses and moist meadows from Worcester and Warwick northwards, ascending to 2,700 ft. in the Highlands; very rare in Ireland; fl. June–July.—*Rootstock* truncate, creeping. *Stem* 1–3 ft., branched above. *Leaves* 3–5 in. diam., radical long-petioled, cauline sessile; stipules ovate. *Flowers* ½–¾ in. diam., blue-purple or rose-coloured, cymose at the ends of the branches. *Filaments* filiform, ciliate.—DISTRIB. Europe (Arctic), Siberia, W. Asia.

3. **G. praten'se,** *L.*; erect, pubescent, hairs reflexed, leaves orbicular 7–9-partite, lobes laciniate coarsely serrate, sepals awned, petals notched, capsule smooth glandular-hairy, pedicels deflexed, seeds minutely reticulate.

Moist meadows, &c. from Banff and Isla southwards, ascending to 1,800 ft. in the Highlands; N.E. of Ireland only, very rare; fl. June–Sept.—*Rootstock* truncate. *Stem* 3–4 ft., branched above. *Leaves* 3–6 in. diam., all petioled; petioles of radical very long; stipules subulate-lanceolate. *Flowers* many, 1¼ in. diam. *Sepals* with very long awns. *Filaments* glabrous, cuneate at the base.—DISTRIB. Europe (Arctic), Siberia.

4. **G. pyrena'icum,** *L.*; erect or ascending, pilose, leaves reniform 7–9-lobed to the middle, lobes cuneate 3-fid crenate, sepals mucronate, petals 2-lobed, capsules keeled pubescent, pedicels deflexed, seeds smooth.

Meadows, rarely, if ever, indigenous, from York and Denbigh southwards, Ireland; a denizen, *Watson;* fl. June–Aug.—*Rootstock* fusiform. *Stems* 1–2 ft., many, decumbent below. *Leaves* 3 in. broad, radical very long-petioled; lobes contiguous; stipules ovate-lanceolate. *Flowers* ½ in. diam., bright red-purple. *Sepals* small, oblong. *Claw of petals* densely bearded. DISTRIB. Europe, N. Africa, W. Asia to India.

G. PHÆ'UM, *L.*; erect, laxly hairy and glandular above, leaves orbicular or reniform 5–7-lobed lobes cut and serrate, sepals mucronate, petals waved, capsules hairy wrinkled above, pedicels deflexed, seeds smooth.

Woods near parks and gardens, naturalized; fl. May–June. — *Rootstock* truncate. *Stems* 1–2 ft., many. *Leaves* 3–5 in. broad, radical very long-petioled; stipules lanceolate. *Flowers* ¾ in. diam., dusky purple. *Sepals* oblong, shortly-awned. DISTRIB. Central and W. Europe.

*** *Annual or biennial. Stems ascending or decumbent. Peduncles 2-flowered. Sepals spreading.*

5. **G. mol'le,** *L.*; softly pilose, leaves orbicular 7–9-lobed, segments contiguous, sepals mucronate generally shorter than the notched petals, claw of petals bearded, capsules wrinkled keeled glabrous, seeds smooth.

Pastures and waste places, ascending to 1,500 ft. in Yorkshire; fl. May–Sept. —*Branches* 8–12 in. *Leaves* 1–2 in. diam., lobes broadly irregularly lobed or crenate at the tip, radical very long petioled; stipules lanceolate. *Peduncles* axillary. *Flowers* ⅓–½ in. diam., rose-purple or pink.—DISTRIB. Europe, N. Africa, W. Asia.

6. **G. rotundifo'lium,** *L.*; laxly pilose, leaves as in *G. molle*, sepals mucronate generally shorter than the entire petals, claw of petals naked, capsules keeled not wrinkled hairy, seeds pitted.

Hedges and waste places, rare, from Gloucester and Suffolk southwards; local in Ireland; fl. June to July.—*Branches* 6–12 in., slender, geniculate. *Leaves* ¾–1 in. broad; stipules short. *Flowers* ⅜–½ in. diam., pale pink. *Petals* narrow.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India.

7. **G. pusil'lum,** *L.*; softly pubescent, leaves as in *G. molle* but deeper lobed, sepals acute equalling the notched petals, claw of petals faintly ciliate, capsule keeled not wrinkled pubescent, seeds smooth.

Hedgebanks and waste places; rare in Scotland and Ireland; fl. June–Sept.—*Branches* 6–18 in.; stipules ovate-lanceolate. *Peduncles* axillary. *Flowers* ¼–⅜ in. diam., many, pale rose-colour. *Perfect stamens* often only 5. —DISTRIB. Europe, N. Africa, W. Asia; introd. in America.

8. **G. columbi'num,** *L.*; nearly glabrous, leaves 5–7-partite, lobes distant pinnatifid, segments narrow, sepals large acuminate long-awned equalling the entire petals, claw ciliate, capsule not wrinkled keeled glabrous, seeds pitted.

Dry copses and pastures, from Forfar and Dumbarton southwards; rare in Scotland and Ireland; fl. June–July.—*Branches* 8–24 in., slender, hairs reflexed. *Leaves* ¾–1¼ in. broad, long-petioled; stipules ovate-lanceolate. *Flowers* ½–¾ in. broad, few, rose-purple; peduncles and pedicels very long and slender. *Calyx* angular.—DISTRIB. Europe, N. Africa, Siberia.

9. **G. dissec'tum,** *L.*; pilose and subglandular, leaves as in *G. columbinum*, peduncles very short, sepals long-awned, petals short obovate notched, capsules not wrinkled or keeled hairy, seeds pitted.

Hedges and waste places, ascends to near 1,000 ft. in Yorkshire; fl. May–Aug. —Similar to *G. columbinum*, but petioles and peduncles very much shorter, and calyx and capsules quite different. *Stipules* ovate, long-acuminate. *Flowers* ½–¾ in. diam., axillary, bright red.—DISTRIB. Europe, N. Africa, W. Asia, N. America.

**** *Annual or biennial. Stems ascending or decumbent. Peduncles 2-flowered. Sepals erect in flower, conniving in fruit.*

10. **G. Robertia'num,** *L.*; glabrous or slightly hairy, leaves 5-foliolate, leaflets 1–2-pinnatifid, sepals long-awned, petals entire narrow, capsule wrinkled keeled, seeds smooth. *Herb-Robert.*

Waste places and hedgebanks, ascends to near 2,000 ft. in Yorkshire; fl. May–Sept.—Plant fœtid, reddish. *Branches* 6–18 in., brittle, leafy. *Leaves* 1–3 in. broad; petioles ½–1 in.; stipules ovate. *Flowers* ½ in. diam., streaked with dark and light red, sometimes white. *Calyx* angular. *Claw of petals* glabrous. *Carpels* attached by silky hairs to the axis.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to N.W. India.

VAR. 1, *Robertianum* proper; glandular-hairy, blade of petal about as long as the claw; carpels with deciduous hairs.—VAR. 2, *Raii*, Lindl. (sp.); almost glabrous, sepals and pedicels glandular-pubescent, blade of petal shorter than the claw, carpels glabrous. *G. modes'tum*, Jord. Guernsey and Torquay.—VAR. 3, *purpu'reum*, Jord. (sp.); as in VAR. 2, but leaves more finely divided Shingly beaches, S. of England.

11. **G. lu'cidum,** *L.*; glabrous, shining, bright red, branches above with 2 lines of hairs, leaves orbicular 5-lobed, sepals long-awned longer than the petals, capsules wrinkled keeled glabrous or nearly so, seeds smooth.

Hedgerows, old walls, &c. from Ross southwards, local; fl. May–Aug.—*Branches* 6–18 in., succulent, brittle. *Leaves* ¾–1½ in. broad, lobes short obtusely lobulate at the top; petioles 1–2½ in.; stipules ovate, acute. *Peduncles* longer than the petioles. *Flowers* ¼–⅓ in. diam., rose-coloured. *Calyx* pyramidal, tuberculate. *Claw of petals* glabrous. *Carpels* separating wholly from the axis.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. Himalaya.

2. ERO'DIUM, *L'Héritier.* STORK'S-BILL.

Herbs with swollen nodes. *Leaves* alternate, or, if opposite unequal, stipulate. *Flowers* regular, solitary or umbellate, on axillary peduncles. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate, 2 upper sometimes deficient. *Stamens* 5, alternating with scale-like staminodes. *Disk* of 5 glands opposite the sepals. *Ovary*, fruit and seed as in *Geranium*, but tails of carpels spirally twisted and usually silky on the inner surface.—DISTRIB. Europe, N. Africa, temp. Asia; rare in S. Africa and Australia; species 50.—ETYM. ἐρώδιος, *a heron*, from the form of the fruit.

1. **E. cicuta'rium,** *L.*; leaves 1–2-pinnate, leaflets pinnatifid, segments narrow cut, peduncles few or many-flowered, filaments entire.

Waste places, most frequent by the sea, ascends to 1,200 ft. in N. Wales; fl. June–Sept.—Annual or biennial; laxly pilose and glandular. *Stems* at first short, then elongating to 6–24 in., prostrate or decumbent. *Leaves* 6–18 in., oblong; stipules lanceolate. *Peduncles* longer than the leaves, strict. *Flowers* ⅓–½ in. broad, umbelled, rosy or white. *Petals* rather unequal, two often spotted at the base, entire. *Carpels* hairy with an eglandular subapical pit and usually a shallow curved furrow below the pit; pedicels reflexed.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India.

VAR. 1, *commix'tum*, Jord. (sp.); two upper petals with a spot at the base, carpels distinctly furrowed.—VAR. 2, *trivia'le*, Jord. (sp.); two upper petals not spotted, carpels faintly furrowed.—VAR. 3, *pilo'sum*, Bor. (sp.), petals not spotted, leaflets with more divided segments, carpels not furrowed.

2. **E. marit'imum,** *L.*; leaves entire oblong or ovate-cordate, margin lobulate, segments crenate, peduncles 1–2-flowered, filaments entire.

Sandy and gravelly W. shores, from Cornwall to Wigtonshire; Farnham, Surrey; and all round Ireland; fl. May–Sept.—Small, piloso, annual or biennial. *Stems* 6–16 in., decumbent. *Leaves* ¼–⅓ in., petioles longer; stipules ovate. *Flowers* ⅓ in. diam., pale pink. *Petals* sometimes 0. *Carpels* hairy with a deep subapical eglandular pit subtended by a straight deep furrow.—DISTRIB. W. Europe, from France to Italy.

3. **E. moscha'tum,** *L.*; leaves pinnate, leaflets deeply sharply irregularly serrate, antheriferous filaments toothed at the base.

Waste places, &c. from Yorkshire to Anglesea southwards, not indigenous inland; local in Ireland; fl. June–July.—Larger than *E. cicutarium*, covered with spreading hairs, smelling strongly of musk. *Stem* 2 ft., stout; stipules broadly ovate, obtuse. *Flowers* pale rose-purple. *Carpels* hairy with a glandular subapical pit subtended by a deep curved furrow.—DISTRIB. Europe, N. Africa, W. Asia.

3. OXA'LIS, *L.* WOOD-SORREL.

Acid herbs. *Leaves* radical or alternate, stipulate or exstipulate, compound, usually 3-foliolate. *Flowers* on axillary 1- or more-flowered peduncles, regular. *Sepals* 5, imbricate in bud. *Petals* 5, twisted in bud. *Stamens* 10, free or connate at the base. *Disk* 0. *Ovary* 5-lobed, 5-celled; styles 5, stigmas terminal; ovules 1 or more in each cell. *Capsule* loculicidal, valves adhering by the septa to the axis. *Seeds* with an elastic dehiscent fleshy coat, testa crustaceous, albumen fleshy; embryo straight. —DISTRIB. 3 or 4 species widely dispersed, the rest S. African and S. American; species 220.—ETYM. ὄξυς, *acid.*—Leaflets pendulous at night, often sensitive to light.—Tetramorphic flowers occur; petaliferous large, others minute apetalous and very fertile.

1. **O. Acetosel'la,** *L.*; pilose, stemless, leaves all radical 3-foliolate, stipules broad membranous, scape 1-flowered. *Wood-sorrel.*

Moist shady places, ascending to near 4,000 ft. in the Highlands; fl. April–Aug.—Glabrous or pilose. *Rootstock* creeping, scaly. *Petioles* 3–6 in.; leaflets obcordate, ½–¾ in., often purple beneath. *Scape* axillary, slender, 2-bracteate about the middle. *Flower* ½–¾ in. diam. *Sepals* oblong. *Petals* obovate, white veined with purple, erose, cohering above the claw. *Capsule* erect, 5-gonal; cells 2-3-seeded.—DISTRIB. Europe (Arctic), N. Africa, Siberia and W. Asia to the Himálaya, E. and W. N. America.

O. CORNICULA'TA, *L.*; pubescent, stems branched procumbent without runners, leaves all cauline 3-foliolate, stipules adnate, peduncles axillary 2–3-flowered, fruiting pedicels deflexed, capsules downy.

Waste shady places, local, possibly indigenous in S.W. England, not north of it; fl. June–Sept.—Very variable in size and habit; annual or biennial. *Stems* 6–16 in. *Leaves* as in *O. Acetosella.* *Flowers* ¾ in. diam., subumbellate, very long-peduncled, yellow. *Seeds* transversely ribbed.—DISTRIB. Ubiquitous, except in very cold regions.

O. STRIC'TA, *L.*; subglabrous, stem erect with copious runners at the base, leaves as in *O. corniculata* but often whorled and stipules minute, peduncles 2–8-flowered, capsule glabrous, pedicel spreading.

A weed in Cheshire and south of it, local; not indigenous; fl. June–Sept.—Similar to and distribution of *O. corniculata,* of which it is perhaps a subspecies.

4. IMPA'TIENS, *L.* BALSAM.

Herbs, rarely shrubby. *Leaves* opposite or alternate, stipules 0 or glandular. *Flowers* irregular, resupinate, on 1- or more-flowered axillary peduncles. *Sepals* 3, rarely 5, petaloid, imbricate; 2 anterior (if present) minute; 2 lateral small, flat; posterior large, produced into a hollow spur. *Petals* 3; anterior external in bud, large; lateral 2-lobed. *Stamens* 5, filaments short broad; anthers cohering. *Disk* 0. *Ovary* oblong, 5-celled; stigma sessile, 5-toothed; ovules many in each cell, 1-seriate. *Capsule* loculicidal, valves 5, elastic, springing away from the placentas. *Seeds* smooth or villous, albumen 0; embryo straight.—DISTRIB. Mountains of trop. Asia and Africa; rare in temp. Europe, N. America, N. Asia and S. Africa; species 135.—ETYM. The Latin name, from the ripe capsules burst-

'ing when touched.—The anterior lateral sepals occur in a few Indian species. Minute flowers, fertilized when still in bud, occur in some.

1. **I. Noli-me-tan'gere,** *L.*; glabrous, leaves oblong obtuse crenate-serrate, peduncles 1–3-flowered, posterior sepal funnel-shaped gradually contracted into a slender spur with an entire tip. *Yellow Balsam.*

Moist mountainous situations, probably wild in N. Wales, Lancashire, and Westmoreland; introd. elsewhere; a native? *Watson;* fl. July–Sept.—Annual, succulent, 1–2 ft., nodes thickened. *Leaves* 2–4 in., alternate, membranous; petioles half as long, slender. *Flowers* 1¼ in., drooping, pale-yellow dotted with red.—DISTRIB. Europe, Siberia, W. Asia.

I. FUL'VA, *Nuttall;* habit and characters of *I. Noli-me-tangere,* but leaves acute, serratures more shallow, flowers orange, posterior sepal saccate suddenly contracted into an upcurved spur with a notched tip.

Naturalized on river-banks in Surrey, the Clyde, and various other places; fl. June–Aug.—A N. American plant, naturalized within the last 40 years, and spreading rapidly.

ORDER XXI. ILICIN'EÆ OR AQUIFOLIA'CEÆ.

Shrubs or trees. *Leaves* alternate, simple, exstipulate, often coriaceous and evergreen. *Flowers* small, in axillary cymes, often polygamous. *Calyx* 3–6-parted, imbricate in bud, persistent. *Petals* 4–5, free or connate at the base, deciduous, imbricate in bud. *Stamens* 4 or 5, hypogynous, free or adhering to the petals; filaments subulate; anthers oblong. *Disk* 0. *Ovary* free, 3–5-celled, style 0 or short, stigma terminal; ovules 1, or 2 and collateral, pendulous, raphe dorsal, micropyle superior; funicle often cupular. *Drupe* with 3 or more 1-seeded free or connate stones. *Seed* with a membranous testa, fleshy albumen, and minute straight embryo.—DISTRIB. Temp. and trop. regions, absent from N.W. America; genera 3; species 150. —AFFINITIES. Very close with *Olacineæ,* differing only in the several-celled ovary.—PROPERTIES. Antiseptic and astringent. Holly berries are purgative and emetic; bark yields bird-lime. "Mati" or "Paraguay tea" is the leaf of *Ilex Paraguayensis.*

1. I'LEX, *L.* HOLLY.

Calyx 4–5-parted, persistent. *Corolla* rotate; petals connate at the base or free. *Stamens* 4, adhering to the base of the corolla. *Ovary* 4–6-celled; stigmas free or confluent. *Drupe* globose, with 4 stones or a 4–5-celled stone.—DISTRIB. Trop. and temp. regions, abundant in S. America, rare in Africa and Australia; species 145.—ETYM. doubtful.

1. **I. Aquifo'lium,** *L.*; glabrous, shining, leaves ovate spinescent.

Copses and woods, often planted; ascends to 1,000 ft. in the Highlands; fl. May–Aug.—A shrub or small tree, 10–40 ft., young shoots puberulous; bark ashy, smooth. *Leaves* glossy, 2–3 in., acute or acuminate, with waved spinous cartilaginous margins, those on the upper branches often entire. *Cymes* umbellate, shortly peduncled, many-flowered. *Flowers* ¼ in. diam., white, often subdiœcious. *Sepals* ovate, puberulous. *Petals* obovate, concave. *Stamens* 4, erect. *Stigmas* 4, sessile. *Fruit* scarlet, rarely yellow; stones 4, bony, furrowed.—DISTRIB. Europe from S. Norway to Turkey and the Caucasus; W. Asia.

ORDER XXII. EMPETRA'CEÆ.

Heath-like evergreen shrubs. *Leaves* alternate, exstipulate. *Flowers* small, solitary or clustered, axillary or terminal, usually dicecious, regular, bracteolate or not. *Sepals* 2–3, free, coriaceous or thin, imbricate in bud. *Petals* 2–3, hypogynous, free, persistent.—MALE fl. *Stamens* 3–4, alternate with the petals, hypogynous; filaments long, filiform, free, persistent; anthers deciduous, 2-celled, bursting inwards, pollen compound. *Ovary* rudimentary.—FEMALE fl. *Staminodes* minute. *Ovary* globose, 3–9-celled; styles short, stigmas subulate or dilated: ovule 1, ascending from the inner angle of each cell, anatropous. *Drupe* depressed-globose, with 2–9 bony 1-seeded connate or free stones. *Seed* erect, 3-gonous, testa thin, albumen fleshy; embryo straight, slender, axile, cotyledons short, radicle superior.—DISTRIB. Temp. and Arctic N. hemisphere, Chili and Fuegia; genera 3; species 4.—AFFINITIES. Very close to *Ilicineæ* (Decaisne and Maout); reduced form of *Ericaceæ* (A. Gray); with *Buxeæ* and *Euphorbiaceæ* (A. DC., &c.).—PROPERTIES unimportant.

1. EMPE'TRUM, *L.* CROWBERRY.

Flowers bracteolate. *Sepals* and *petals* 3 each, quite entire. *Ovary* 6–9-celled; stigmas 6–9, dilated. *Drupe* fleshy; stones free.—DISTRIB. of the Order; species 1.—ETYM. *ἐν πέτρον*, from growing in *stony* places.

1. **E. ni'grum,** *L.*; leaves linear-oblong margins so recurved as to meet over the midrib.

Heaths and rocks, in Scotland, Ireland, and mountainous parts of England; ascending to 4,000 ft. in the Highlands; fl. April–June.—Glabrous, tufted; branches 6–18 in., slender, wiry, spreading and trailing, leafy. *Leaves* ¼–½ in., crowded, obtuse, reddish in age, sides minutely scabrid, the recurved portion concealing the pubescent under-surface of the leaf, which forms a hollow cylinder closed at both ends. *Flowers* minute, sessile. *Sepals* rounded, concave. *Petals* scarious, subspathulate, pink, reflexed. *Filaments* very long; anthers red. *Drupe* ¼–⅓ in., black (often purple in N. America, red in S. America). *Berries* eatable.—The structure of the leaf is very curious.

ORDER XXIII. CELASTRI'NEÆ.

Trees or shrubs, sometimes spinous or climbing. *Leaves* opposite and alternate, simple, stipulate or not. *Flowers* small, cymose. *Calyx* small, 4–5 lobed, imbricate in bud, persistent. *Petals* 4–5, short, imbricate in bud. *Stamens* 4–5, inserted on the disk, filaments subulate; anthers small. *Disk* flat, tumid, or lobed. *Ovary* sessile, 3–5-celled; style entire or 3–5-fid, stigmas terminal; ovules 2, erect from the base of the cells, anatropous, raphe ventral. *Fruit* various, dehiscent or not. *Seeds* erect, usually arillate (the arillus, being produced from the exostome, an *arillode*), albumen fleshy or 0; cotyledons large, foliaceous.—DISTRIB. Temp. and trop. plants, genera 40; species 400.—AFFINITIES. With *Ampelideæ* and *Sapindaceæ;* less strong with *Ilicineæ* and *Rhamneæ*.—PROPERTIES. Purgative and emetic.

1. EUON'YMUS, *L.* SPINDLE-TREE.

Shrubs or trees. *Leaves* opposite, persistent; stipules caducous. *Flowers* small, in axillary cymes. *Calyx* 4–6-fid. *Petals* 4–6, and stamens as many, both inserted on a broad, fleshy, 4–6-lobed disk. *Ovary* confluent with the disk, 3–5-celled; style short, stigma 3–5-lobed. *Capsule* 3–5-lobed and celled, angled or winged, loculicidal, cells 1–2 seeded. *Seeds* with a complete arillode, albumen fleshy; embryo straight.—DISTRIB. Temp. Europe, Asia, and N. America; species 40.—ETYM. *Euonyme*, mother of the Furies, the berries being poisonous.

1. **E. europæ'us,** *L.*; leaves ovate- or oblong-lanceolate serrulate.

Copses and hedges, &c. from Lanarkshire southwards; rare in Scotland, local in Ireland; fl. May–June.—A glabrous fetid shrub or tree, 5–20 ft.; bark grey, smooth, twigs 4-angled green. *Leaves* 1–4 in., acute or acuminate; petioles short. *Cymes* dichotomous, 5–10 flowered; peduncles 1–2 in. *Flowers* ½ in. diam., greenish white. *Capsule* ½ in., deeply 4-lobed, pale crimson; arillode orange.—DISTRIB. Europe to the Caucasus, N. Africa, W. Siberia. —Wood hard and tough, used for the finer sorts of gunpowder, spindles, &c.

ORDER XXIV. **RHAM'NEÆ.**

Trees or shrubs, often spiny, erect or climbing. *Leaves* simple, alternate or opposite, often 3–5-nerved; stipules small. *Flowers* small, sometimes unisexual, green or yellow. *Calyx-tube* coriaceous; lobes 4–5, triangular, valvate in bud. *Petals* 4, 5, or 0, inserted on the throat of the calyx, small, usually clawed, hooded. *Stamens* 4–5, inserted with and opposite the petals which often enclose them, filaments subulate; anthers small, versatile. *Disk* large, annular, cupular or coating the calyx-tube. *Ovary* 3-celled, sessile or sunk in the disk, free or adnate to the calyx-tube; styles short, simple or 3-lobed, stigmas terminal; ovules 1 in each cell, basal, erect, anatropous, raphe usually ventral. *Fruit* various, free or girt with the calyx-tube. *Seeds* compressed, sometimes arillate, albumen fleshy or 0; embryo large, often green, cotyledons plano-convex.—DISTRIB. Chiefly in warm and temp. regions; genera 37; species 430.—AFFINITIES. With *Celastrineæ*, and certain *Euphorbiaceæ*.—PROPERTIES. Purgative. *Rhamnus* yields a green dye.

1. RHAM'NUS, *L.* BUCKTHORN.

Leaves alternate, deciduous. *Flowers* in small axillary cymes, often unisexual. *Calyx-tube* urceolate. *Petals* 4–5 or 0. *Stamens* 4 or 5, very short. *Disk* coating the calyx-tube. *Ovary* free, base sunk in the bottom of the calyx-tube, 3–4-celled; style 3–4-fid, stigmas obtuse. *Drupe* girt with the calyx-tube; stones 2–4, 1-seeded. *Seeds* obovoid, albumen fleshy; cotyledons flat or with recurved margins; radicle short.—Temp. and trop. regions, none Australian; species 60.—Position of raphe variable, dorsal lateral or ventral.

1. **R. cathar'ticus,** *L.*; branchlets spinous, leaves ovate acutely serrate, nerves divergent, flowers 4-merous dicœcious.

Woods and thickets from Ayrshire southwards, chiefly on chalk, perhaps not wild S. of Durham, rare in Ireland; fl. May–July.—A rigid shrub, 5–10 ft.,

much branched; bark blackish. *Leaves* 1-2 in., fascicled at the ends of the shoots, subopposite lower down, shortly petioled, young downy beneath; stipules subulate, deciduous. *Flowers* ¼ in. diam., solitary or fascicled in the axils of the fascicles of leaves on the previous year's wood, yellow-green; pedicels very short. *Calyx* of the male campanulate, female cupular, lobes acute. *Style* 4- rarely 2- or 5-cleft. *Drupe* ¼ in. diam., globose, black; stones 4, obovoid, grooved at the back. *Albumen* longitudinally curved and like a horseshoe; embryo obcordate, similarly curved.—DISTRIB. Europe, N. Africa, Siberia; cult. for hedges in the U. States.

2. **R. Fran'gula,** *L.*; unarmed, leaves obovate quite entire, nerves parallel, flowers 5-merous bisexual. *Berry-bearing Alder.*

Woods and thickets, common in England, Ayr and Moray in Scotland, very rare in Ireland; fl. May-June.—Shrub 5-10 ft.; branches slender. *Leaves* alternate; stipules subulate. *Flowers* ⅛ in. diam., few, axillary, greenish-white, pedicels ½ in. *Calyx* campanulate. *Style* entire. *Drupe* ¼ in. diam., globose, black when ripe; stones compressed, broadly obovoid. *Seed* of the same form.—DISTRIB. Europe, N. Africa, Siberia.—Drupes cathartic, when unripe used to dye green; wood used by gunpowder-makers and called Dogwood.

ORDER XXV. SAPINDA'CEÆ.

Tribe ACERI'NEÆ.

Trees; juice often sugary, sometimes milky. *Leaves* opposite, simple or pinnate, deciduous. *Flowers* racemed or corymbose, often polygamous, regular; the lower or earlier in the raceme generally male, the terminal 2-sexual. *Calyx* 5- rarely 4-12-parted, deciduous, imbricate in bud. *Petals* as many or 0, imbricate in bud. *Stamens* 8, rarely indefinite; inserted on the disk. *Disk* annular, thick, lobed or 0. *Ovary* laterally compressed, 2- rarely 3-4-lobed and celled; styles 2, filiform, stigmatose on the inner surface; ovules 2 in each cell, attached by a broad base, superposed or collateral. *Fruit* of 2, rarely 3 or 4 spreading samaras. *Seed* ascending, compressed, testa membranous, inner coat fleshy; cotyledons plaited, radicle long.—DISTRIB. Europe, N. Asia, N. America, Java, most abundant in the Himalaya and Japan; genera 3; species 50.—AFFINITIES. Allied to *Celastrineæ*. The tribe *Acerineæ* differs from the other plants of the great tropical order of *Sapindaceæ* chiefly in the opposite leaves, and stamens inserted on (not within) the disk.—PROPERTIES. Sugar is made from the juice of American species.

1. A'CER, *L.* MAPLE.

Leaves simple, entire or lobed. *Disk* annular.—DISTRIB. of the Tribe.—ETYM. The Latin name.

1. **A. campes'tre,** *L.*; leaves reniform obtusely 5-lobed entire lobulate or crenate, corymbs erect, wings of fruit horizontal. *Common or Small-leaved Maple.*

Thickets and hedgerows, from Durham southwards; naturalized in Scotland; rare in Ireland; fl. May-June.—Small tree 10-20 ft., with spreading branches; bark rough, fissured; wood beautiful, fine-grained. *Leaves* 2-4 in.

diam., pubescent when young; petiole 1–1½ in., slender. *Corymbs* 1–2 in. *Flowers* ¼ in. diam., green, shortly pedicelled. *Sepals* linear-oblong. *Petals* similar, but narrower; wings of fruit linear-oblong, slightly curved, each ½ in. long.—DISTRIB. Europe, from Denmark southwards, W. Asia.

A. PSEUDOPLAT'ANUS, *L.*; leaves 5-angled 5-lobed, lobes crenate-serrate, racemes elongate pendulous, wings of fruit divergent. *Great Maple, Sycamore, Plane* of Scotland.

Thickets and woods; naturalized only; fl. May–June.—A tall umbrageous tree, 40–60 ft. *Bark* smooth, outer layer deciduous. *Leaves* 4–8 in. diam., glaucous beneath, lobes acute or acuminate. *Flowers* as in *A. campestre*, but pedicels shorter, and stamens longer. *Ovary* villous. *Samaras* 1½ in., scimitar-shaped.—DISTRIB. Mid. Europe and W. Asia.—Sap sugary. Wood much used for turnery, &c.

ORDER XXVI. LEGUMINO'SÆ.

Suborder PAPILIONA'CEÆ.

Herbs, rarely shrubs. *Leaves* alternate, 3- or more-foliolate, rarely simple; stipules usually present; leaflets often stipellate. *Inflorescence* various. *Flowers* irregular. *Calyx* of 5 connate sepals, often 2-lipped. *Petals* 5, very unequal, free or 2 or more adherent by their claws to the staminal tube, imbricate in bud; upper (*standard*) broad, often reflexed, exterior in bud; 2 lateral (*wings*) parallel, enclosing and sometimes adhering to the 2 lower (*keel*), which are interior in bud, and free, or connate by their lower edges. *Stamens* 10, perigynous, filaments united into a sheath, or the upper one free, their free tips equal or alternate longer; anthers usually versatile. *Disk* lining the base of the calyx-tube. *Ovary* of one 1-celled carpel, included in the staminal sheath; style incurved, stigma simple oblique or terminal; ovules 2 or more, 1–2-seriate on the ventral suture, campylotropous or anatropous, horizontal erect or pendulous. *Fruit* a dry pod (legume) dehiscent along one or both sutures or not at all, continuous or septate internally. *Seeds* with a coriaceous testa, and simple or dilated funicle, albumen 0; cotyledons plano-convex, radicle incurved, incumbent.—DISTRIB. Chiefly N. temp. but found all over the globe; few in New Zealand; genera 295; species 4,700.—AFFINITIES. Principally with *Rosaceæ*.—PROPERTIES too numerous to mention here.

The tribal characters here given apply to British Genera to the exclusion of many exotic members.

SERIES 1. *Leaves* 1- *to* 3-*foliolate, without tendrils.*

TRIBE I. **GENIS'TEÆ.** Shrubs. *Leaves* 0 or 1-foliolate or digitately compound; leaflets quite entire. *Stamens* all united. *Pod* 2-valved.

Calyx shortly 2-lipped, lips deeply toothed ..... 1. Genista.
Calyx deeply 2-lipped, yellow ..... 2. Ulex.
Calyx shortly 2-lipped, lips minutely toothed ..... 3. Cytisus.

TRIBE II. **TRIFO'LIEÆ.** Herbs, rarely shrubs. *Leaves* pinnately rarely digitately 3-foliolate; veins generally ending in teeth. *Upper stamen* usually free.

Filaments all united ..... 4. Ononis.

Upper filament free.
Racemes short. Pod longer than calyx, curved dehiscent...5. Trigonella.
Racemes short. Pod usually spiral .....6. Medicago.
Racemes long. Pod short, indehiscent. Keel free .....7. Melilotus.
Flowers capitate. Pod short, 1–4-seeded. Keel adnate.....8. Trifolium.

SERIES 2. *Leaves 5- or multi-foliolate, with a terminal leaflet.*

TRIBE III. **LO'TEÆ.** Herbs or shrubs. *Leaves* pinnately 5-many-foliolate; leaflets quite entire. *Upper stamens* free or not; alternate filaments often dilated. *Pod* 2-valved, without a longitudinal septum.
Calyx inflated, including the pod.....9. Anthyllis.
Calyx not inflated, pod exserted dehiscent.....10. Lotus.

TRIBE IV. **GALEGE'Æ** (sub-tribe ASTRAGALE'Æ). Herbs or shrubs. *Leaves* pinnately 5-multi-foliolate; leaflets quite entire. *Upper stamen* free. *Pod* 2-valved, turgid or flat with a longitudinal septum.
Keel obtuse.....11. Astragalus.
Keel beaked or with an incurved tip.....12. Oxytropis.

TRIBE V. **HEDYSAR'EÆ.** Herbs or shrubs. *Leaves* pinnately 3-multi-foliolate. *Upper filament* free. *Pod* indehiscent, of 1 or many 1-seeded joints.
Pod cylindric, many-jointed .....13. Ornithopus.
Pod flat, of many curved 1-seeded joints.....14. Hippocrepis.
Pod flat, hard, 1-seeded .....15. Onobrychis.

SERIES 3. *Leaves abruptly pinnate (or leaflets 0); petiole ending in a tendril or point.*

TRIBE VI. **VICIEÆ.** Herbs. *Leaves* pinnate; petiole ending in a tendril or point. *Leaflets* often toothed. *Upper stamen* free. *Pod* 2-valved.
Style filiform, hairy below or all round.....16. Vicia.
Style flattened, hairy on the upper side only.....17. Lathyrus.

1. GENIS'TA, *L.*

Shrubs, sometimes spinous. *Leaves* 1-foliolate in British species; stipules minute or 0. *Flowers* racemed, yellow, rarely white, bracteate. *Calyx* shortly 2-lipped; upper lip deeply 2-fid, lower shorter 3-toothed. *Wings* oblong, gibbous at the base, adnate to the staminal tube, *deflexed* after flowering. *Filaments* all united, tube entire; *anthers alternately* short and versatile, and long and basifixed. *Style* incurved, stigma oblique; ovules 2 or more. *Pod* 2-valved or indehiscent, 1-celled.—DISTRIB. Europe, W. Asia, N. Africa; species 70.—ETYM. obscure.

1. **G. tincto'ria,** *L.*; unarmed, leaflet oblong or lanceolate nearly glabrous, racemes slender, keel and pod glabrous. *Dyers' Greenweed.*

Meadows and fields, from Wigton and Edinburgh southwards; rare in Scotland; Co. Dublin only in Ireland; fl. July–Sept.—*Stems* 1–2 ft., branched, rigid, striate. *Leaflets* ½–1 in., appressed, ciliate; stipules minute, subulate. *Flowers* ½ in., yellow. *Calyx* deciduous above the base; teeth acuminate. *Pod* 1–1½ in., compressed, 5–10-seeded.—DISTRIB. Europe, from Gothland southwards, N. Asia; introd. in N. America.—Yields a yellow dye.

VAR. 1, *gla'bra,* Syme; glabrous, branches erect or ascending.—VAR. 2, *humifu'sa,* Syme; branches decumbent hairy as are the pedicels calyx and pod. Kynance Cove.

2. **G. pilo'sa,** *L.*; unarmed, leaflet obovate-lanceolate obtuse complicate recurved silky beneath, racemes short leafy, keel and pod pubescent.

Gravelly heaths, rare and local, from Suffolk to S. Wales, and Kent to Cornwall; fl. May–Sept.—*Stem* much branched, curved, prostrate, tortuous, woody. *Leaflets* ¼ in., very shortly petioled; stipules ovate, obtuse. *Flowers* ½ in., yellow. *Calyx* with 2 upper lobes lanceolate, and 3 lower subulate. *Pod* ⅔ in., deciduous, flat, valves bulging over the seeds.—DISTRIB. Europe, from Gothland southwards.

3. **G. ang'lica,** *L.*; glabrous, spinous, leaflet ovate oblong or lanceolate, racemes short leafy, keel and pod glabrous. *Needle Furze.*

Heaths and moist moors, from Ross southwards, ascends to 2,200 ft. in the Highlands; absent in Ireland; fl. May–June.—*Branches* 1–2 ft., slender, spreading, curved; spines ½–1 in., slender, recurved, simple, rarely branched. *Leaflets* $\frac{1}{10}$–⅓ in.; stipules obsolete. *Flowers* ½ in., yellow, shortly pedicelled. *Calyx* persistent; teeth short, triangular. *Pod* ¾ in., deciduous, inflated, acuminate at both ends.—DISTRIB. W. Europe, from Denmark to France and Germany.

2. U'LEX, *L.* FURZE, WHIN, GORSE.

Densely thorny shrubs. *Leaves* 3-foliolate in seedling plants, in mature spinescent or reduced to small scales, exstipulate. *Flowers* yellow, axillary; bracts small. *Calyx* membranous, coloured, 2-partite, upper lobe 2- lower minutely 3-toothed. *Petals* shortly clawed; keel and wings obtuse. *Stamens* as in *Genista*. *Style* smooth, stigma capitate; ovules many. *Pod* 2-valved, 1-celled.—DISTRIB. W. Europe to Italy, N.W. Africa; species 12.—ETYM. doubtful.

1. **U. europæ'us,** *L.*; bracts large ovate lax, calyx hairs spreading, teeth minute, wings longer than the keel.

Heaths, &c., rarer in the North; ascends to 2,100 ft. in Wales; fl. Feb–March, and Aug.–Sept.—Bush 2–5 ft., rounded, spinous; spines 1–2 in., straight. *Leaves* small; leaflets hairy; spines sometimes furnished with minute 1-foliolate leaves. *Flowers* ¾ in., irregularly racemose, bright yellow, odorous, borne on the spines. *Calyx* hairs black. *Pod* ¾ in., black, covered with brown hairs, dotted.—DISTRIB. Denmark to Italy and Greece, Canaries and Azores.

VAR. 1, *europæ'us* proper; branches spreading, spines furrowed rigid.—VAR. 2, *strict'us,* Mackay (sp.); branches erect compact, spines soft 4-gonous. *Irish Furze.* Lord Londonderry's park, Down.

2. **U. na'nus,** *Forster;* bracts minute, calyx with appressed pubescence, teeth lanceolate, wings about equalling the keel.

Heath and commons, from Ayr and Northumberland southwards; common in Ireland; fl. July–Nov.—Much smaller than *U. europæus*. *Stem* 1–3 ft. *Spines* ½–1½ in. *Flowers* ½ in., more spiked, more orange.—DISTRIB. Belgium, W. France, Spain.

Sub-sp. NA'NUS proper; branches procumbent drooping, primary spines weak short, wings straight shorter than the keel.—S. of England.

Sub-sp. GAL'LII, *Planchon* (sp.); branches ascending, primary spines rigid, wings curved rather longer than the keel.—Heaths and downs in the West, from Wigton to Somerset.

3. CYTIS'US, *L.* BROOM.

Shrubs, rarely spinous. *Leaves* 1–3-foliolate or 0. *Stipules* minute. *Flowers* yellow, purple, or white. *Calyx* 2-lipped; upper lip minutely 2-lower 3-toothed. *Wings* oblong, and keel obtuse, deflexed after flowering, their claws free. *Stamens* as in *Genista*. *Style* incurved or coiled, smooth, stigma terminal; ovules many. *Pod* flat, elongate, 2-valved, many-seeded, somewhat septate. *Seeds* with a tumid funicle.—DISTRIB. Europe, N. Africa, W. Asia.—ETYM. obscure.

1. **C. scopa'rius,** *Link;* branchlets and obovate leaflets silky. *Spartium*, L. *Sarothamnus*, Koch.

Heaths, commons, &c. from Sutherland southwards; ascends to 2,000 ft. in the Highlands; fl. May–June.—Shrubby, 2–6 ft., hairy; branches green, angular, furrowed. *Leaves* shortly petioled; leaflets 1–3, ¼–½ in. *Flowers* 1 in., bright yellow, pedicels short. *Style* spiral. *Pod* 1–2 in., black; valves twisted after dehiscence.—DISTRIB. Europe, N. Asia, Canaries and Azores.—Twigs diuretic, and used for tanning. Seeds a substitute for coffee.

4. ONO'NIS, *L.* REST-HARROW.

Herbs or small shrubs, with often viscid hairs. *Leaves* pinnately 3-foliolate, nerves ending in teeth; stipules adnate to the petiole. *Flowers* pink or yellow; bracts minute or 0, upper leaves bracteæform; peduncles sometimes spinescent. *Standard* broad; wings oblong; keel incurved, pointed, not adnate to the staminal tube. *Filaments* all united, 5 or all dilated above; anthers uniform, or the alternate smaller. *Style* incurved, smooth, stigma terminal; ovules 2 or many. *Pod* turgid or terete, 1-celled, 2-valved.—DISTRIB. Europe, W. Asia, N. Africa; species 60.—ETYM. The Greek name for the genus.

1. **O. arven'sis,** *L.*; perennial, procumbent, viscid and hairy, leaflets oblong, pods ovate erect shorter than the calyx. *Wild Liquorice.*

Dry pastures, sandy shores, &c. from Sutherland southwards; not common in Ireland; fl. June–Sept.—*Rootstock* elongate, stoloniferous. *Stems* 1–2 ft., shrubby, rooting at the base, prostrate or ascending, rarely spinous. *Lower leaves* 3- upper 1-foliolate; leaflets ¼–¾ in., oblong-obovate, toothed. *Flowers* ¾ in., axillary, subracemose, rosy; peduncles 1-flowered, not articulate. *Pod* 1–3-seeded. *Seeds* granulate.—DISTRIB. Europe, Azores.

2. **O. spino'sa,** *L.*; perennial, suberect, stem with a line of pubescence, pod ovate erect longer than the calyx. *O. campestris*, Koch.

Waste places, moors, &c. from Forfar and Dumbarton southwards; rare in Scotland; absent in Ireland; fl. June–Aug.—Similar in many respects to *O. arvensis*, but has no runners, is less viscid and hairy, less strongly scented, and is smaller leaved.—DISTRIB. Europe, W. Asia.—Possibly only a subspecies of *O. arvensis*.

3. **O. reclina'ta,** *L.*; annual, spreading, viscid and hairy, pod cylindric oblong reflexed.

Alderney; naturalized on sea-cliffs, Mull of Galloway; fl. June–July.—*Stem* 2–3 in. *Leaflets* ¼–½ in., acutely toothed; stipules large, ½-ovate. *Pedicels* slender, articulate beneath the flower. *Flower* ½ in., rosy. *Pod* ½ in., glandular and hairy, as long as the calyx or longer.—DISTRIB. W. of France, Spain, Italy, Greece.

5. TRIGONEL'LA, *L.* FENUGREEK.

Herbs, often strongly scented. *Leaves* pinnately 3-foliolate; nerves terminating in teeth; stipules adnate to the petiole. *Flowers* solitary, capitate, or in dense racemes, white, yellow, or blue. *Calyx* tubular, teeth subequal. *Petals* very persistent; wings longer than the keel, the claws of both free from the staminal tube. *Filaments* not dilated, upper free or nearly so; anthers uniform. *Style* glabrous, stigma terminal; ovules many. *Pod* various in form, dehiscent in the British species, longer than the calyx.—DISTRIB. Europe, temp. Asia, N. and S. Africa, Australia; species 50.—ETYM. The old Greek name.

1. **T. ornithopodioi'des,** *DC.*; glabrous, prostrate, very slender, leaflets obcordate, keel nearly as long as the wings. *Trifolium,* L. *Aporan'thus Trifolias'trum,* Bromfield.

Sandy heaths and gravelly places, rare, from the Forth and Clyde southwards; East of Ireland very rare; fl. June–Aug.—Annual or biennial, branching from the base; branches 2–8 in., slender. *Leaflets* ½–⅔ in., toothed, strongly nerved; petiole ½–1 in.; stipules large, ovate, long-acuminate. *Peduncles* solitary, shorter than the petioles, axillary, 1–3-flowered. *Flowers* ⅓ in., very shortly pedicelled, white and pink. *Pod* ¼–½ in., linear-oblong, slightly curved, obtuse, partially dehiscent, 6–8-seeded.—DISTRIB. Denmark, France, Portugal, Italy, and Turkey.—An anomalous species, on account of the length of the keel; habit of *Trifolium subterraneum.*

6. MEDICA'GO, *L.* MEDICK.

Herbs. *Leaves* pinnately 3-foliolate, nerves ending in teeth; stipules adnate to the petiole. *Flowers* small, yellow or violet; stipules small or 0. *Calyx-teeth* 5, nearly equal. *Keel* obtuse, shorter than the oblong wings, not adnate to the stamens. *Filaments* not dilated, upper free; anthers uniform. *Style* subulate, glabrous, stigma subcapitate; ovules few or many. *Pod* spirally curved or coiled, very rarely falcate, often spiny, rarely dehiscent.—DISTRIB. Europe, W. Asia, N. Africa; species 40.—ETYM. The Greek name.

* *Perennial. Pod dehiscent, falcate, annular, or coiled into an open helix, smooth, many-seeded; marginal nerve* 0.

1. **M. falca'ta,** *L.*; decumbent, flowers subcorymbose, pods linear compressed curved or annular downy.

Gravel banks and waste sandy places in the E. counties; an alien or denizen, *Watson;* fl. June–July.—*Stems* 6–24 in., diffuse. *Leaflets* ¼–⅓ in., narrowly linear, or obovate-oblong, toothed, notched and mucronate at the tip; stipules large, subulate. *Flowers* ⅓ in., shortly pedicelled. *Pod* ½ in.—DISTRIB. Europe, N. Asia.

Sub-sp. FALCA'TA proper; flowers yellow, pod falcate.

Sub-sp. SYLVES'TRIS, *Fries* (sp.); flowers yellow then dark green, pod semicircular or annular.

M. SATI'VA, *L.*; erect, flowers racemose, pod with 2–3 coils downy. *Purple Medick.*

Hedges and fields, not indigenous; fl. May–July.—*Stem* 1–2 ft., fistular, branched. *Leaflets* narrowly obovate-oblong, toothed, tip notched and

apiculate. *Flowers* ⅓–½ in., in a short dense raceme, usually blue or purple; peduncles longer than the leaves, pedicels very short. *Pod* ¼ in. diam.—DISTRIB. Europe, in cultivation only, naturalized in the U. States. —Perhaps only a form of *M. falcata.*

** *Annual or biennial. Pod indehiscent, reniform, tip coiled, smooth,* 1-*seeded; marginal nerve* 0.

2. **M. lupuli'na,** *L.*; procumbent, flowers in ovoid heads, pods reticulate. *Black Medick.*

Waste places and fields; ascends in the Lake district to 1,000 ft.; fl. May–Aug.—Pubescent or glabrous. *Stems* 6–24 in., much branched. *Leaflets* ¼–⅓ in., obovate, toothed, apiculate; petioles very short; stipules ½-cordate. *Flowers* ⅛ in., peduncles longer than the petioles; pedicels very short. *Pods* ⅛–⅙ in., black.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India; introd. in N. America.

*** *Annual. Pod indehiscent, coiled into a closed helix, many-seeded; bordered with spines or tubercles; with a strong marginal nerve.* (*Stems prostrate. Leaflets obovate or obcordate, toothed. Peduncles few-flowered. Flowers yellow; calyx-teeth subulate, incurved.*)

3. **M. denticula'ta,** *Willd.*; nearly glabrous, stipules laciniate, pod flat deeply reticulate with 2 or 3 coils and a double row of spines.

E. and S. counties from York and Norfolk to Devon, naturalized elsewhere; a denizen? *Watson;* fl. May–Aug.—*Stem* 6–24 in., furrowed. *Leaflets* ¼–1 in. *Flowers* ⅛ in., umbellate, yellow; pedicels very short. *Pod* ¼ in. diam.—DISTRIB. Mid. and S. Europe, N. Africa, W. Asia to India; introd. in N. America.

VAR. 1, *denticula'ta* proper; spines subulate, half the diameter of the pod.—VAR. 2, *apicula'ta,* Willd. (sp.); spines of pod very short.

4. **M. macula'ta,** *Sibthorp;* nearly glabrous, stipules ½-cordate toothed, pod subglobose faintly reticulate with 3–5 coils and a double row of long curved spines.

Pastures and hedgebanks, from York and Durham southwards; S. of Ireland, doubtfully native; fl. May–Aug.—*Stems* 1–2 ft., numerous. *Leaflets* ¼–1 in., obovate obcordate or cuneate, with often a black central spot; stipules herbaceous; petiole pilose. *Flowers* ⅛ in., yellow. *Pod* ¼ in. broad; margin with 4 ridges.—DISTRIB. Europe, N. Africa; introd. in N. America.

5. **M. min'ima,** *L.*; downy, stipules ½-cordate faintly toothed, pod subglobose faintly reticulate, with 4 or 5 coils and a double row of close-set hooked spines.

Sandy fields, rare; E. counties, from Norfolk and Cambridge to Surrey, and in Glamorgan; fl. May–July.—*Stems* 6–10 in., very many, rigid, prostrate. *Leaflets* ¼–⅓ in., from narrowly to very broadly obovate. *Flowers* ⅛ in. *Pod* ¼ in. diam., margin keeled.—DISTRIB. Europe, N. Africa, W. Asia.

7. MELILO'TUS, *Tournefort.* MELILOT.

Annual or biennial, fragrant herbs. *Leaves* pinnately 3-foliolate, nerves ending in teeth; stipules adnate to the petiole. *Flowers* in axillary racemes, small, drooping, yellow or white; bracts minute or 0. *Calyx-teeth* 5, nearly equal. *Petals* very deciduous; standard oblong; keel shorter than the wings, obtuse, not adnate to the stamens. *Filaments* not dilated

upwards, the upper free, or only so above the middle; anthers uniform. *Style* filiform, stigma terminal; ovules few. *Pod* short, straight, thick, hardly dehiscent. *Seeds* 1 or few.—Warm and temp. regions of the Old World; species 10.—ETYM. *mel* and *lotus*, from the *honeyed* smell.

1. **M. officina'lis,** *L.*; erect, petals nearly equal, pod ovoid compressed acuminate reticulate hairy.

Fields, &c. from Durham southwards; very rare in Ireland; a denizen, *Watson;* fl. June–Aug.—Annual or perennial. *Stem* 2–3 ft., much branched. *Leaflets* ½–1½ in., obovate- or linear-oblong toothed; stipules subulate, very slender. *Racemes* 3–4 in. *Flowers* ¼ in., secund, deep yellow, pedicels short. *Corolla* more than twice as long as the calyx. *Pod* black when ripe, 1–2-seeded.—DISTRIB. Europe, Siberia, W. Asia to India; introd. in N. America.

2. **M. al'ba,** *Lamk.*; standard longer than the wings or keel, pod ovoid acute reticulate glabrous. *M. vulgaris,* Willd.; *leucantha,* Koch. *White Melilot.*

Waste places, not rare, from Norfolk and S. Wales southwards; Ireland naturalized; an alien or colonist? *Watson;* fl. July–Aug.—Very similar to *M. officinalis,* but more slender; flowers smaller, white, in long racemes; pods more ovoid and glabrous, also black when ripe.—DISTRIB. Europe, Siberia, W. Asia to India; introd. in N. America.

M. ARVEN'SIS, *Wallroth;* standard longer than the keel as long as the wings, pod ovoid obtuse mucronate transversely ribbed rugose glabrous.

Waste places, chiefly in the E. counties, also in Ireland, not indigenous in either; fl. June–Aug.—Habit, &c. of the preceding. *Flowers* pale-yellow or white. *Pod* olive-brown when ripe.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India.

8. TRIFO'LIUM, *L.* TREFOIL, CLOVER.

Herbs, usually low. *Leaves* digitately, rarely pinnately 3-foliolate; stipules adnate to the petiole. *Flowers* capitate or spiked, rarely solitary, red, purple or white, rarely yellow; bracts small or 0, sometimes forming a toothed involucre. *Calyx-teeth* 5, subequal. *Petals* persistent; wings longer than the keel, the claws of both adnate to the staminal tube. *Upper stamens* free; all the filaments or 5 of them dilated at the tip; anthers uniform. *Style* filiform, stigma oblique or dorsal; ovules few. *Pod* small, indehiscent, 1–4-seeded, nearly enclosed in the calyx.—DISTRIB. North temp. and warm regions, rare in Southern; species 150.—ETYM. in allusion to the 3 leaflets.

SECTION 1. *Heads* axillary. *Fertile flowers* few. *Calyx* enclosing the 1-seeded pod, which at length splits; its throat naked. *Petals* caducous. *Pods* burrowing in the earth when ripening, then covered by the reflexed deformed calyces of the other flowers.

1. **T. subterra'neum,** *L.*; very hairy, stipules broadly ovate acute, calyx-teeth setaceous as long as the tube, deformed calyces slender with 5 rigid palmate lobes.

Gravelly and sandy pastures, from Anglesea and Nottingham southwards; fl. May–June.—Annual; covered with spreading soft hairs. *Stems* ½–2 ft.,

very many, prostrate. *Leaflets* ⅓ in., broadly obcordate. *Heads of flowers* ¼ in. diam., lengthening after flowering. *Flowers* cream-coloured. *Pod* orbicular, compressed. *Seeds* shining.—DISTRIB. Europe from Holland southwards, N. Africa, W. Asia to N.W. India.

SECTION 2. *Heads* many-flowered, rarely axillary, globose or oblong, pedicels ebracteate. *Calyx* not inflated; throat with a ring of hairs or callous constriction (obscure in *T. Bocconi*); teeth ciliate, equal or the lower longest. *Petals* usually persistent. *Pod* sessile, 1-seeded.

* *Heads cylindric or oblong during or after flowering.*

2. **T. arven'se,** *L.*; softly hairy, leaflets narrow obovate-oblong longer than the petioles, stipules with very long setaceous points, heads terminal peduncled soft cylindric, calyx-teeth persistent longer than the petals plumose. *Hare's-foot Trefoil.*

Dry pastures and fields, from Isla and Ross southwards; rare and local in Ireland; fl. July–Sept.—Annual. *Stems* many, ascending or subercct. *Leaflets* ½–¾ in. *Heads* ½–1 in., dense. *Flowers* minute, white or pale pink.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in America.

3. **T. Bocco'ni,** *Savi;* pubescent, leaflets obovate, stipules ovate with setaceous points, heads axillary and terminal cylindric sessile, calyx glabrous teeth straight erect spinescent rather shorter than the petals.

Dry places, Lizard and Ruan-Minor in Cornwall, very rare; a native? *Watson;* fl. July.—Annual. *Stems* 2–4 in. (10–12 in. in cultivation). *Leaves* shortly petioled; leaflets ¼–¾ in., glabrous above, variable in breadth. *Heads* ¼–½ in. *Flowers* white. *Calyx* with a very obscure ring in the throat. *Pod* enclosed in the (not ventricose) calyx.—DISTRIB. France, Spain, Italy, to Turkey; Canaries.

4. **T. incarna'tum,** *L.*; softly pubescent or villous, leaflets broadly obovate or obcordate, stipules obtuse, heads peduncled terminal ovoid or cylindric, calyx hairy teeth shorter than the corolla spreading in fruit. *Crimson Clover.*

Fields and roadsides; not in Ireland; fl. June–July.—Annual. Very variable in size and pubescence. *Stems* rather slender. *Leaves* shortly petioled; leaflets ¾–1½ in. *Heads* 1–2 in. *Flowers* ½ in. *Calyx-ribs* strong.—DISTRIB. S. and W. Europe.

Sub-sp. *incarna'tum* proper; hairs of stem spreading, calyx-teeth hairy to the tips, flowers bright scarlet.—An escape from cultivation. A common fodder crop.

Sub-sp. MOLINE'RII, *Balbis* (sp.); hairs of stem appressed, heads shorter, calyx-teeth glabrous at the tips, flowers pale white or rose.—Lizard Point and Kynance Cove, amongst short grass; native? *Watson.* Probably the original form, of which *incarnatum* is the cultivated state.

** *Heads ovoid or globose.*

5. **T. ochroleu'cum,** *L.*; softly pubescent, leaflets obovate or oblong, heads terminal globose at length ovoid, peduncles short subtended by opposite leaves, calyx-teeth spinescent spreading and recurved in fruit, lowest much longest.

Dry pastures, local, E. counties, from Norfolk and Bedford to Hants; fl. June–Aug.—Perennial. *Stems* ascending 6–18 in. *Leaflets* ½–1 in., tip

entire or notched ; stipules lanceolate, adnate to the middle. *Heads* ¾–1 in. broad. *Flowers* pale yellow, brown when old. *Calyx* ribbed, half as long as the petals. *Pod* striate, opening by the conical top falling away.—DISTRIB. Europe, from Belgium southwards, W. Asia.

6. **T. praten'se,** *L.* ; more or less pubescent, leaflets oblong, stipules membranous free portion appressed to the petiole, heads terminal sessile globose, at length ovoid, subtended by opposite leaves with much-dilated stipules, calyx-teeth slender setaceous, erect or spreading in fruit, the lowest longest. *Red Clover.*

Pastures, roadsides, &c., both wild and cultivated ; ascending to 1,900 ft. in the Highlands ; fl. May–Sept.—Annual or perennial. *Stems* 6–24 in., solid or fistular, robust or slender. *Leaflets* ½–2 in., often marked with a white spot or lunate band, finely toothed ; stipules often 1–1½ in., with long setaceous points. *Heads* ½–1½ in. diam., pink purple or dirty white. *Calyx-tube* with a 2-lipped contraction in the throat, strongly nerved ; teeth not exceeding the petals, very slender, unequal. *Pod* opening by the top falling off.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to India ; introd. in N. America.—Extensively cultivated for fodder.

7. **T. me'dium,** *L.* ; slightly hairy, leaflets oblong obtuse or acute, stipules herbaceous free portion spreading, heads subglobose terminal shortly peduncled subtended by opposite leaves, calyx-teeth setaceous spreading in fruit, lowest a little longest. *Meadow Clover.*

Pastures, meadows, &c. ; ascending to 1,300 ft. in the Highlands ; fl. June–Sept.—Perennial. *Stems* straggling, flexuous. *Leaflets* 1–2 in., rather rigid, almost quite entire, ciliate. *Heads* 1–1½ in. diam. *Flowers* ¾ in., rose-purple. *Calyx-throat* with a ring of hairs, tube 10-nerved, glabrous ; teeth reaching half-way up the petals. *Pod* dehiscing longitudinally.—DISTRIB. Europe (Arctic), Siberia, W. Asia ; introd. in N. America.

8. **T. marit'imum,** *Hudson ;* pubescent, leaflets narrowly obovate-oblong obtuse or acute, stipules herbaceous free portion linear-subulate spreading, heads terminal ovoid very shortly peduncled subtended by opposite leaves, calyx-teeth short triangular-subulate spreading and herbaceous in fruit, 4 upper shorter than the tube.

Salt marshes and meadows, from Gloucestershire and Norfolk southwards ; fl. June–Aug.—Annual. *Stems* 6–18 in., rigid, decumbent or ascending. *Leaflets* ⅓–¾ in., almost quite entire. *Heads* ½ in., terminal, elongating in fruit. *Calyx* with a 2-lipped contraction in the throat ; tube ribbed ; teeth reaching half-way up the petals. *Pod* 2-valved.—DISTRIB. W. and S. Europe from Holland to Spain, and thence eastwards to Dalmatia, N. Africa.

9. **T. stria'tum,** *L.* ; softly hairy, leaflets obovate, stipules membranous free portion broadly triangular tip recurved, heads sessile terminal and axillary ovoid, calyx ventricose, teeth short spinescent triangular-subulate 1-nerved spreading in fruit.

Dry pastures in England ; rarer in Scotland from Forfar southwards ; very rare in Ireland ; fl. June–July.—Annual. *Stems* 4–12 in., spreading, prostrate or ascending. *Leaflets* ¼–¾ in., almost quite entire, petioles 2 in. ; stipules of the leaves under the heads very much dilated. *Heads* ¼–½ in., dense, broadest at the base. *Flowers* ¼ in. rosy. *Calyx-tube* ovoid, ribbed,

mouth contracted; teeth shorter than the petals.—DISTRIB. Europe from Gothland southwards, N. Africa.

10. **T. sca'brum,** *L.*; pubescent, leaflets narrowly or broadly obovate, stipules rather rigid, free portion short triangular-subulate, heads terminal and axillary sessile ovoid, calyx-tube ribbed, teeth triangular spinescent 1-nerved erect in flower lengthening spreading rigid and recurved in fruit.

Sandy and stony pastures, &c., in England; E. coast of Scotland, from Forfar southwards; E. of Ireland, very rare; fl. May–July.—Annual. *Stems* 4–10 in., rigid, stout, prostrate, zigzag. *Leaves* very shortly petioled, leaflets ¼–½ in., rigid, strongly-nerved, toothed. *Heads* ½–⅔ in. long, broadest in the middle. *Flowers* minute, white. *Calyx-tube* purplish; teeth equalling the petals. *Pod* minute.—DISTRIB. Europe from Belgium southwards, N. Africa.

SECTION 3. *Heads* many-flowered, usually axillary, rarely axillary and terminal; pedicels distinct, short or long, bracteate. *Calyx* not inflated; throat naked; teeth equal or the upper longest. *Pod* 2-4-seeded (1-seeded in *T. strictum* and through imperfection in others).

11. **T. glomera'tum,** *L.*; glabrous, leaflets obovate acute or obcordate, stipules ovate with long points, heads axillary and terminal sessile globose, calyx-teeth short ovate 1-nerved spinescent reticulated spreading in fruit.

Gravelly and sandy pastures, &c., rare, from Norfolk and Denbigh southwards; fl. June.—Annual. *Stems* 6–12 in., prostrate, spreading, slender. *Leaflets* ⅙–⅓ in., nerves fine but strong-toothed. *Heads* ¼ in. diam., distant. *Flowers* blue-purple, subsessile. *Calyx-teeth* nearly equal, shorter than the corolla, contracted at the base. *Standard* persistent, scarious, striate.—DISTRIB. Europe, W. of France, and from Spain to Turkey, N. Africa.

12. **T. suffoca'tum,** *L.*; glabrous, petioles very long, leaflets obcordate, stipules ovate acuminate, heads sessile ovoid, calyx campanulate, teeth not spinescent recurved in fruit exceeding the corolla.

Sandy and gravelly pastures, especially near the sea, rare, from Anglesea and Suffolk to Cornwall and Kent; fl. June–July.—Annual. *Stems* 2–6 in., prostrate, spreading, slender. *Leaflets* ¼–⅓ in., toothed, nerves faint; petioles 1–3 in. *Heads* ¼ in. diam., often confluent, axillary and terminal. *Flowers* minute, whitish. *Standard* persistent, scarious. *Calyx* membranous; teeth herbaceous, lanceolate, as long as the tube.—DISTRIB. S. of France, Portugal, Italy to Greece, Hungary, N. Africa.

13. **T. stric'tum,** *Waldst.* and *Kit.*; glabrous, petioles very short, leaflets linear-lanceolate, stipules broadly ovate acute toothed, heads peduncled globose, calyx-tube campanulate, teeth subulate spinescent nearly equal spreading in fruit.

Rocky banks near the sea, very rare; Lizard rocks, Anglesea (once seen), Jersey; native? *Watson;* fl. June–July.—Annual. *Stems* 2–6 in., few, ascending. *Leaflets* ½–1 in., toothed; nerves slender. *Heads* ¼–⅓ in. broad, terminal and axillary; peduncles ½–1 in., strict. *Flowers* ⅛ in., rose-purple. *Corolla* longer than the calyx. *Pod* obliquely orbicular, compressed, beaked, dorsal suture much thickened, 1-seeded.—DISTRIB. S. of France, Bohemia, Italy and Turkey; N. Africa.

T. HYBRIDUM, *L.*; almost glabrous, leaflets obovate or oblong, stipules oblong tips triangular, heads axillary peduncled globose, pedicels elongate

at length reflexed, flowers drooping, calyx-tube campanulate gibbous, teeth subulate nearly equal unaltered in fruit. *Alsike Clover.*

Fields, &c., introduced with clover, and now often replacing it; fl. June–Aug. —Perennial. *Stems* 2–10 in., flexuous. *Petioles* long; leaflets ½–1½ in., toothed. *Stipules* herbaceous, nerves green. *Heads* ¾–1 in. diam., depressed (from the drooping flowers); peduncles 2–4 in. *Flowers* ½ in., white or rosy. *Calyx* white, teeth green. *Standard* twice as long as the calyx, striate, folded over the 2-seeded pod.—DISTRIB. Europe, N. Africa, W. Asia.

VAR. 1, *hybrid'um* proper; stem stout fistular stipules few-nerved. Naturalized at Saffron Walden.—VAR. 2, *el'egans*, Savi (sp.); stem weak decumbent solid, leaves more sharply toothed, stipules with several nerves, heads small.

14. **T. re'pens,** *L.*; glabrous, leaflets obovate or obcordate, stipules lanceolate acuminate, heads all axillary very long-peduncled globose, pedicels at length reflexed, calyx-tube campanulate gibbous, teeth triangular unaltered in fruit. *White* or *Dutch Clover.*

Meadows and pastures, abundant; ascends to 2,700 ft. in the Highlands; fl. May–October. — Perennial. *Stems* 1–18 in., creeping. *Leaflets* ½–1 in., toothed, with often a white semilunar band towards the base; nerves slender; petioles 2–4 in. *Heads* ½–1½ in. diam.; peduncles 3–6 in. *Flowers* nearly ½ in., white or rosy. *Standard* persistent, brown, covering the pod, much longer than the calyx. *Pod* elongate, 4–6-seeded.—DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to India; N. America (indigenous, *fl. Gray*).

SECTION 4. *Heads* many-flowered, all axillary; pedicels short, bracteate. *Calyx* 2-lipped, becoming inflated above, membranous, reticulated; throat naked; teeth equal, the upper pair lengthening. *Corolla* withering, standard deciduous. *Pod* sessile, 1–2-seeded.

15. **T. fragif'erum,** L.; glabrous, leaflets obovate or obcordate, stipules oblong-triangular with a long point, heads globose dense-flowered long-peduncled, outer bracts lanceolate as long as the calyx, calyx-tube downy above striate vesicular, 2 upper teeth enlarged and deflexed in fruit.

Meadows and ditches, from Westmoreland southwards; rare and local in Scotland and Ireland; fl. July–Aug.—Perennial. *Stems* 6–12 in., creeping. *Heads* ½–¾ in. diam. *Flowers* ½ in., rose-purple. *Pod* ovoid compressed, reticulate, 1–2-seeded.—DISTRIB. Europe. N. Africa, W. Asia to N.W. India.—Habit and appearance when flowering of *T. repens*, from which the large bracts distinguish it; in fruit widely different.

SECTION 5. *Heads* many-flowered, axillary, globose, long-peduncled; pedicels short or 0, bracteate. *Flowers* at length pendulous. *Calyx* not inflated; throat naked; teeth equal, or upper shorter. *Corolla* yellow; standard persistent, enlarged and bent down over the fruit. *Pod* stalked, 1- rarely 2-seeded.—*Leaves* pinnately or palmately 3- rarely 5-foliolate.

16. **T. procum'bens,** *L.*; stems pubescent, leaves more or less pinnately 3-foliolate, leaflets obovate or obcordate, heads many and dense-flowered, standard broad slightly convex arching but not folded over the pods. *T. agra'rium,* Huds. *Hop Trefoil.*

Pastures, roadsides, &c., ascends to near 1,000 ft. in Yorkshire; fl. June–Aug. —Annual. *Stems* 6–18 in., central erect, lateral decumbent. *Leaflets* ¼–¾ in., toothed; petioles ¼–¾ in., slender; stipules ½-ovate, tip triangular, acute. *Heads* ½–¾ in. diam. *Flowers* pale yellow, upper pedicelled. *Calyx* campanulate, upper teeth triangular, very short; lower longer, lanceolate. *Standard* ¼ in., brown, shining. *Pod* obovoid; style hooked. —DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in N. America. —Syme shows this to be *T. procumbens* of Linn. *Herb.*; it may or may not be the *T. agrarium* of Linn. *Sp. Plant.*

17. **T. mi'nus,** *Sm.*; nearly glabrous, leaves pinnately 3-foliolate, leaflets narrow-obovate or obcordate, heads dense-flowered, pedicels very short, standard narrow keeled folded over the pod. *T. procumbens*, Huds.

Pastures and roadsides, &c. from Isla and Banff southwards; ascends to 1,000 ft. in the Lake district; fl. June–Aug. — Annual. *Stems* 10–20 in., straggling, slender. *Leaflets* truncate or notched, finely toothed; petioles very short, slender; upper part of stipules ovate, acuminate. *Heads* 4–20-flowered, much smaller than in *T. procumbens;* peduncles long, very slender. *Flowers* yellow, small, turning dark brown. *Calyx* and *pod* much as in *T. procumbens.*—DISTRIB. Europe and Canaries; introd. in N. America.—This is the *T. filiforme* of foreign authors; and there is much confusion in its nomenclature and that of the preceding and following.

18. **T. filifor'me,** *L.*; sparsely hairy, leaflets obcordate or obovate, heads axillary, peduncles slender, flowers few subracemose, pedicels as long as the calyx-tube spreading or reflexed, standard keeled folded over the pod.

Dry pastures often near the sea, rare, from Oxford and Cardigan southwards; also in Fife and Clackmannan in Scotland; rarer in Ireland; fl. June–July. —Annual. *Stems* 4–8 in., very slender, prostrate. *Leaves* pinnately or digitately 3-foliolate; upper part of stipules ovate, acute. *Leaflets* ⅛–¼ in., toothed at the tip. *Heads* very small, 2–6-flowered; peduncles capillary. *Flowers* yellow. *Calyx* and *pod* much as in the two last species.—DISTRIB. Europe to the Caucasus.

9. ANTHYL'LIS, *L.* KIDNEY-VETCH.

Herbs or shrubs. *Leaves* pinnate, with a terminal leaflet; stipules small or 0. *Flowers* in capitate cymes, sometimes involucrate, yellow-white or red-purple; bracts various or 0. *Calyx* inflated, mouth oblique, 5-toothed. *Petals* with long claws, those of the 4 lower adnate to the staminal tube; standard auricled at the base; keel incurved, gibbous on each side. *Filaments* all united, or the upper free; anthers uniform. *Style* smooth, stigma terminal; ovules two or more. *Pod* enclosed in the calyx, obliquely ovoid, dehiscent or not, 1–3-seeded.—DISTRIB. Europe, Asia, N. Africa; species 20.—ETYM. The old Greek name.

1. **A. Vulnera'ria,** *L.*; silky, stems herbaceous, leaflets 2–6 pairs.

Dry rocky banks, rather local; ascends to 2,400 ft. in the Highlands; fl. June–Aug.—*Rootstock* woody, short, branched. *Stems* 6–16 in., many, leafy, herbaceous, suberect. *Radical leaves* 2–4 in., pinnate, unequal; leaflets ½–1½ in., narrow-oblong. *Heads* ½–1½ in. diam., in pairs, rarely solitary, or with small accessory ones, the pairs peduncled, but each sessile; involucre of subsessile linear appressed or spreading leaflets. *Flowers* ½–¾ in. *Calyx* membranous, longer than the petals; teeth minute, ovate, acute; mouth

contracted. *Pod* very small, acute, glabrous, reticulated, partially dehiscent, 1-seeded.—DISTRIB. Europe (Arctic), N. Africa, W. Asia.

VAR. 1, *Vulnera'ria* proper; involucral leaves short, flowers yellow.—VAR. 2, *Dille'nii*, Schultz (sp.); involucral leaves nearly as long as the red flowers.

10. LO'TUS, *L.* BIRD'S-FOOT TREFOIL.

Herbs or under-shrubs. *Leaves* pinnately or palmately 4–5-foliolate; stipules minute or 0. *Flowers* in capitate or umbellate axillary peduncled cymes, yellow red or white; bracts 3-foliolate. *Calyx* 2-lipped, or with 5-subequal teeth. *Petals* free from the staminal tube; keel incurved or inflexed, beaked, gibbous on each side. *Alternate filaments* dilated upwards, upper free; anthers uniform. *Ovary* sessile; style inflexed, glabrous, stigma terminal or lateral; ovules many. *Pod* elongate, cylindric, 2-valved, septate between the seeds.—DISTRIB. Europe, N. and S. Africa, temp. Asia, America, Australia; species 50.—ETYM. unknown.

1. **L. cornicula'tus,** *L.*; decumbent, heads 5–10-flowered, peduncles very long, calyx-teeth erect in bud, 2 upper triangular converging with an obtuse sinus.

Pastures and waste places, ascending to 2,800 ft. in the Highlands; fl. June–Sept.—Variable in habit and stature. *Rootstock* short, woody, branched, not or scarcely stoloniferous. *Stems* 4–16 in., tufted at the base. *Leaves* very shortly petioled; leaflets ¼–½ in.; stipules ovate or lanceolate. *Heads* ½–1½ in. diam., depressed. *Flowers* ½–¾ in., very shortly pedicelled. *Petals* twice as long as the calyx, bright yellow, often streaked with crimson; often greenish or purple-brown when dry. *Pod* ¾–1¼ in.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to India.

Sub-sp. CORNICULA'TUS proper; stem short, leaflets obovate obtuse or subacute.—VAR. 1, *vulga'ris;* almost glabrous, leaflets membranous.—VAR. 2, *crassifo'lius;* almost glabrous, leaflets fleshy. Chiefly maritime.—VAR. 3, *villo'sus;* covered with spreading hairs. Higham in Kent, Budleigh Salterton and Sandgate.

Sub-sp. TEN'UIS, *Kitaibel* (sp.); stem filiform, leaflets generally linear-lanceolate acuminate, stipules narrower, flowers fewer and smaller. *L. tenuifo'lius*, Reich.; *L. decum'bens*, Forst.—Damp soils, not common, from the Lowlands southwards; very rare in Ireland.

2. **L. ma'jor,** *Scop.*; erect or ascending, heads 5–12-flowered, peduncles very long, calyx-teeth spreading in bud, 2 upper triangular diverging with an acute sinus.

Moist meadows, &c. from Isla and Banff southwards, ascending to 1,200 ft. in Yorkshire; fl. July–Aug.—Perennial, glabrous or hairy. *Rootstock* elongate, stoloniferous, branched at intervals. *Stems* 6–24 in. *Leaflets* ½–1 in., obliquely obovate. *Flowers* and *pods* much as in *L. corniculatus*, except in the calyx.—DISTRIB. Europe, N. Africa.

3. **L. angustis'simus,** *L.*; prostrate or ascending, heads 1–4-flowered, peduncles 2–3 times as long as the leaves, calyx-teeth erect in bud all subulate.

Dry grassy banks, very rare; Castle Rock, Hastings; Stokes Bay, and marshes on the S. coast; Channel Is.; fl. June–Aug.—Annual; much smaller than either of the preceding, with shorter peduncles, fewer flowers; calyx-

teeth slender, longer than the tube, reaching ¾ way up the petals.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.

VAR. 1, *diffu'sus*, Smith (sp.); flowers 1–2, standard broader than long fading green, pod 1–1½ in.—VAR. 2. *his'pidus*, Desf. (sp.); more silky, flowers 2–4, standard longer than broad not fading green, pod ½–¾ in. Lizard, Land's End, Dartmouth, &c.

11. ASTRAG'ALUS, *L.* MILK-VETCH.

Herbs or shrubs. *Leaves* pinnate with a terminal leaflet, rarely 3-foliolate; leaflets entire; stipules free connate or adnate to the petiole. *Flowers* in axillary racemes or spikes; bracts small. *Calyx* tubular; teeth 5, subequal. *Petals* usually narrow with long claws; keel obtuse. *Upper filament* free; anthers uniform. *Ovary* sessile or stalked; style filiform, beardless, stigma terminal; ovules many. *Pod* 2-valved, often longitudinally 2-celled by the inflexion of the suture next to the keel.—DISTRIB. Temp. and cold regions; most abundant in Asia; absent in S. Africa and Australia; species 500.—ETYM. doubtful.

1. **A. glycyphil'los,** *L.*; glabrous, stipules free, flowers racemed, peduncles much shorter than the leaves, pods suberect exserted elongate many-seeded.

Fields and copses; chiefly on the E. coasts, from Ross and Banff southwards; absent from Ireland; fl. June–Sept.—*Rootstock* short, stout. *Stems* 2–3 ft., prostrate, stout, zig-zag. *Leaves* 4–6 in.; leaflets ¾–1½ in., broadly oblong, obtuse, glabrous above, slightly hairy below; stipules 1 in., ovate-lanceolate, acute, lower auricled. *Racemes* 1–2 in., compact, ovoid; bracts subulate, longer than the short pedicels. *Flowers* ½ in., creamy white. *Calyx* campanulate, half as long as the petals. *Pod* 1–1½ in., linear, terete, curved, acuminate, 2-celled, pale. *Seeds* many, pale, compressed. — DISTRIB. Europe, N. Asia.

2. **A. hypoglot'tis,** *L.*; hairy, stipules connate, flowers spiked, peduncles usually much longer than the leaves, pods very short ovoid suberect included 2-seeded.

Gravelly and chalky soil in the E. counties, from Ross to Essex; Isle of Arran only in Ireland; fl. June–July. — Clothed with soft white hairs mixed with black above. *Rootstock* very slender, straggling, branching. *Stems* 2–6 in., slender, ascending. *Leaves* 2–4 in.; leaflets ⅛–⅓ in., many, oblong or linear-oblong, obtuse. *Spikes* 1 in., ovoid; peduncles stout. *Flowers* ½–¾ in., blue-purple. *Calyx* with black hairs, longer than the bracts. *Pod* shortly stipitate.—DISTRIB. Arctic and Alpine Europe, N. Asia, E. and W. N. America.

3. **A. alpi'nus,** *L.*; decumbent, pilose, stipules free, flowers shortly racemose or subcapitate, peduncles rather shorter than the leaves, pods oblong pendulous exserted few-seeded. *Phaca Astragali'na*, DC.

Aberdeen and Forfar, very rare; Craig-an-dal near Braemar, and head of Glendole; alt. 2,400–2,600 ft.; fl. July.—Perennial, more slender than *A. hypoglottis*; leaves very similar; peduncles shorter; flowers horizontal or drooping, pale blue tipped with purple; calyx shorter. *Pod* ½ in., 1-celled, stalk longer than the calyx, hence wholly exserted, covered with black hairs.—DISTRIB. Arctic and Alpine Europe, N. Asia, E. and W. N. America.

12. OXY'TROPIS, *DC.*

Herbs or shrubs. *Leaves* pinnate with a terminal leaflet; leaflets quite entire; stipules free or adnate to the petiole. *Flowers* in axillary spikes or racemes, purple white or pale yellow; bracts membranous. *Calyx* tubular, teeth subequal. *Petals* with long claws; keel erect, with a straight or recurved tooth at the tip. *Upper filament* free; anthers uniform. *Ovary* sessile or stalked; style beardless, stigma minute; ovules many. *Pod* longitudinally more or less 2-celled, by the inflexion of the suture next the standard.—DISTRIB. Europe, temp. and cold Asia, and N. America; species 100.—ETYM. ὀξύς and τρόπις, from the *sharp keel.* —Habit, &c. of *Astragalus;* distinguished only by the mucronate keel, and septum of the pod never being produced from the dorsal suture.

1. **O. Uralen'sis,** *DC.*; silky, leaflets ovate-lanceolate, peduncles longer than the leaves, flowers pale purple. *O. Halleri,* Bunge.

Dry rocky pastures in Scotland, from Wigton to Caithness; ascending to perhaps 2,000 ft.; fl. June–July.—*Rootstock* stout, woody; branches very short. *Leaves* 2–4 in., stipules lanceolate, membranous; leaflets ¼ in., many, close-set. *Heads* 6–10-flowered; peduncles stout, erect; bracts leafy, shorter than the calyx. *Flowers* ¾ in., pale; keel tipped with dark purple. *Calyx-tube* oblong, hairy and slightly glandular, cylindric; teeth short, subulate. *Pod* about 1 in., erect, ovoid, beak curved, sessile, tumid, bursting the calyx, hairy (1- or 2-celled, *Brit. Fl.*), many-seeded.—DISTRIB. Arctic and sub-Alpine Europe, N. Asia, E. and W. N. America.

2. **O. campes'tris,** *DC.*; softly hairy, leaflets linear-oblong or oblong-lanceolate, flowering peduncles shorter than the leaves, flowers pale yellow.

Alpine rocks, Bradoony in the Clova Mts.; alt. 2,000 ft.; fl. June–July.—Habit of *O. Uralensis,* but larger; leaves 4–6 in.; leaflets usually longer, sometimes 1 in., narrower, more obtuse; peduncles lengthening after flowering to 8 in.. *Flowers* ¾ in., yellow tinged with purple. *Pod* ½–⅔ in., sessile, ovoid-lanceolate, hairy, half 2-celled, beak curved.—DISTRIB. Arctic and Alpine Europe, Siberia, E. and W. N. America.

13. ORNITHO'PUS, *L.* BIRD'S-FOOT.

Slender, hairy herbs. *Leaves* pinnate with a terminal leaflet; leaflets small; stipules membranous. *Flowers* minute, in long peduncled heads or umbels, pink white or yellow. *Calyx-lobes* equal, or 2 upper connate. *Keel* obtuse, sometimes very short. *Alternate filaments* dilated upwards, the upper free; anthers uniform. *Style* inflexed, stigma capitate; ovules many. *Pod* curved, slender, indehiscent, breaking up into many short 1-seeded joints.—DISTRIB. Europe, N. Africa, W. Asia.—ETYM. ὄρνις and πούς, from the fruits resembling *bird's claws.*

1. **O. perpusil'lus,** *L.*; bracts pinnate, flowers white, pod much constricted between the seeds.

Sandy and gravelly places from Moray and Dumbarton southwards; east of Ireland, very rare; fl. May–July.—Annual, grey-green, hairy above. *Stems* 6–18 in., many, prostrate, filiform, leafy, sparingly branched. *Leaves* 1–2 in., upper sessile; leaflets ⅛–¼ in., close-set, 6–14 pair, oblong or linear-oblong, the lowest pair recurved when at the base of the petiole; stipules minute.

Peduncles axillary, slender, strict, longer or shorter than the leaves. *Heads* 3–6-flowered. *Flowers* ⅛ in., veined with red; pedicels very short. *Calyx-tube* subcampanulate; teeth short. *Pod* ½–1 in., 7–9-jointed, beaked, glabrous or pubescent, reticulated.—DISTRIB. Europe, N. Africa.

2. **O. ebractea'tus,** *Brotero;* bracts 0, flower yellow, pod slightly constricted between the seeds. *Arthrolo'bium ebracteatum*, DC.

Sandy places, Scilly and Channel Is.; fl. June–Aug.—Annual, glaucous, nearly glabrous. *Stems* 6–18 in., filiform, ascending. *Leaves* 1–4 in., all petioled; leaflets ½–⅔ in., oblong, distant. *Heads* 2–5-flowered; peduncles as long as the leaves. *Flowers* ¼ in., bright yellow with red veins. *Pod* ¾–1 in., very slender, beaked, 10–14-jointed, granulate.—DISTRIB. W. and S. Europe from France to Italy and Turkey, Canaries, Azores.

14. HIPPOCRE'PIS, *L.* HORSESHOE-VETCH.

Diffuse, glabrous herbs. *Leaves* pinnate with a terminal leaflet; leaflets many, quite entire, stipules small or 0. *Flowers* yellow, nodding. *Calyx* with 2 upper teeth connate. *Petals* long-clawed; keel incurved, beaked. *Style* inflexed, subulate, stigma minute; ovules many. *Alternate filaments* slightly dilated, upper free; anthers uniform. *Pod* flat, curved, upper margin deeply notched opposite each seed, breaking up into 3–6 horseshoe-like joints. *Seeds* curved.—DISTRIB. Europe, N. Africa, W. Asia; species 12.—ETYM. Ἵππος and κρηπίς, from the shape of the joints of the pod.

1. **H. como'sa,** *L.*; leaflets 4–8 pair oblong-obovate.

Rocky and stony pastures in the S. of England; ascends to 1,800 ft. in Yorkshire; rare in the North, Ayr and Kincardine; fl. May–Aug.—Nearly glabrous. *Rootstock* branched. *Stems* 6–18 in., very many, branched, ascending. *Leaves* 2–6 in.; leaflets ¼–½ in. *Heads* 6–10-flowered; peduncles curved, slender, longer than the leaves. *Flowers* ⅓–½ in., shortly pedicelled, yellow. *Calyx-tube* short, broad. *Petals* at length reflexed. *Pod* 1–1½ in., falcate, granulate.—DISTRIB. W. and S. Europe, N. Africa.

15. ONO'BRYCHIS, *Tournefort.* SAIN-FOIN.

Herbs or shrubs. *Leaves* pinnate with a terminal leaflet; leaflets quite entire; stipules scarious. *Flowers* purple red or white, in axillary spikes or racemes. *Calyx-lobes* subulate. *Wings* short; keel obliquely truncate, as long as or longer than the standard. *Upper filament* free at the base; anthers uniform. *Style* inflexed, stigma minute. *Pod* compressed, indehiscent, not jointed, often spiny winged or crested, 1–2-seeded.—DISTRIB. Europe, temp. Asia and Africa; species 50.—ETYM. obscure.

1. **O. sati'va,** *Lamk.*; pod tubercled on the lower margin.

Dry fields and pastures in the S.E. of England, perhaps indigenous, elsewhere usually a relic of cultivation; a native? *Watson;* fl. June–Aug.—A perennial herb, 1–2 ft., pubescent with appressed hairs. *Rootstock* woody, branched. *Stems* ascending, stout, tough, leafy. *Leaves* 3–6 in.; leaflets ½–¾ in., obovate or linear-oblong, apiculate, very shortly petioled; stipules ovate-lanceolate, membranous. *Racemes* ovoid, compact; peduncles slender, erect; bracts subulate. *Flowers* ½ in., bright rosy-red, veins darker; wings very short. *Calyx* short, woolly, teeth subulate. *Pods* ½–¾ in., obliquely semicircular in outline, strongly reticulate, pubescent, 1-seeded.—DISTRIB. W. and S.

Europe, N. Asia.—Much cultivated as fodder crop on dry soils, because of the depth its roots penetrate.

16. VIC'IA, *L.* VETCH, TARE.

Climbing or diffuse herbs. *Stems* with prominent ridges. *Leaves* abruptly pinnate; petioles ending in a simple or branched tendril (except *V. Orobus*); leaflets many, entire or toothed at the tip; stipules ½-sagittate. *Flowers* blue, purple or yellow, axillary, racemed. *Calyx-teeth* subequal or the lower longer. *Wings* adnate to the keel. *Staminal tube* abruptly truncate; filaments filiform, upper more or less free; anthers uniform. *Style* inflexed, cylindric or flattened, glabrous or downy all round, or with a tuft of hairs below the terminal stigma externally; ovules usually many. *Pod* compressed, 2-valved. *Seeds* globose, with a small arillus.—DISTRIB. Temp. N. hemisphere, and S. America; species 100.—ETYM. The old Latin name.

SECTION 1. **Er'vum,** *L.* (gen.). Annuals. *Leaflets* few. *Flowers* few. *Calyx* equal at the base. *Style* equally pubescent all round.

1. **V. tetrasper'ma,** *Mœnch;* leaflets 3–6 pair, peduncles 1–2-flowered, pod shortly stipitate glabrous 3–8-seeded.

Hedges, cornfields, &c. from Lanark and Forfar southwards; rare and hardly indigenous in Scotland; S. and E. of Ireland, very rare; fl. May–Aug.—Almost glabrous. *Stems* 1–2 ft., filiform. *Leaflets* variable, ¼–1 in., usually truncate, narrow; tendrils once or twice forked; lower stipules 2-fid, upper entire, toothed on the base at one side. *Peduncles* ¾–1½ in., produced beyond the flowers; pedicels slender, curved. *Flowers* ¼ in., pale blue. *Calyx-tube* short, upper teeth shortest. *Pod* ½–¾ in., linear-oblong.—DISTRIB. Europe, N. Africa, W. Asia to India; introd. in N. America.

Sub-sp. TETRASPER'MA proper; leaflets 4–6 obtuse mucronate, peduncles as long as the leaves 1–2-flowered, pod 3–4-seeded.

Sub-sp. GRAC'ILIS, *Loiseleur* (sp.); leaflets 3–4 pair acuminate, peduncles longer than the leaves 1–4-flowered, pod longer 5–8-seeded.—From Warwick and Cambridge southwards; a native or colonist, *Watson.*

2. **V. hirsu'ta,** *Koch;* leaflets 6–8 pair obtuse mucronate, peduncles 1–6-flowered, pod sessile hairy 2-seeded. *Common Tare.*

Hedges and waste places; fl. May–Aug.—Habit of *V. tetrasperma*, but hairy; leaflets smaller, more numerous; stipules often 4-lobed; pedicels straighter; flowers smaller, and pods much shorter, sessile, hairy and 2-seeded.—DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to N.W. India; introd. in N. America.

SECTION 2. **Crac'ca.** Perennial. *Leaflets* many. *Flowers* very many. *Calyx-tube* gibbous at the base, teeth very unequal. *Style* equally pubescent all round. *Pod* rather short, stipitate, 3–many-seeded.

3. **V. Crac'ca,** *L.*; tendrils branched, stipules ½-sagittate nearly entire, flowers bright blue.

Hedges, fields, and waste places; ascending to 2,400 ft. in the Highlands; fl. June–Aug.—Pubescent or slightly silky. *Rootstock* creeping. *Stems* 2–6 ft., angled, scandent or diffuse. *Leaves* 1–4 in., sessile; leaflets ½–1 in., linear-oblong, acute or mucronate. *Raceme* dense, 10–30-flowered, unilateral;

peduncles longer than the leaves, pedicels short. *Flowers* ½ in., drooping. *Calyx-tube* short. *Pod* ¾–1 in., obliquely truncate, beaked, many-seeded.—DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia to the Himalaya, Greenland, N. America.

4. **V. Or'obus,** *DC.*; tendrils 0, stipules ½-sagittate slightly toothed, flowers white tinged with purple. *Or'obus sylvat'icus*, L. *Bitter Vetch.*

Western wooded and rocky districts, from Skye to Somerset; W. and Mid. Ireland, very rare; fl. June–Sept.—Sparingly pubescent. *Stem* 1–2 ft., erect, stout, leafless or with reduced leaves below. *Leaves* 2–3 in., sessile: leaflets ¾–1½ in., linear-oblong or oblong-lanceolate, acute, or obtuse and mucronate; petiole produced beyond the leaflets. *Racemes* loose, 6–20-flowered, unilateral; peduncles as long as or longer than the leaves; pedicels much shorter than the calyx-tube. *Flowers* ½ in. *Pods* oblong-lanceolate, 1 in., acute at both ends, glabrous, 3–5-seeded.—DISTRIB. Norway, Denmark, France, Germany.

5. **V. sylvat'ica,** *L.*; tendrils branched, lower stipules lunate toothed, flowers white with blue veins. *Wood Vetch.*

Rocky woods, not common, from Ross and Elgin southwards; ascending to near 1,700 ft. in the Highlands; not uncommon in Ireland; fl. June–July. —Glabrous. *Rootstock* creeping. *Stems* 2–4 ft., usually trailing. *Leaves* 2–4 in., sessile; tendrils usually much branched; leaflets ½–1 in., oblong, obtuse, mucronate, membranous; stipules with spreading teeth. *Racemes* laxly 6–18-flowered, unilateral; peduncles as long as or longer than the leaves; pedicels nearly as long as the calyx-tube. *Flowers* ¾ in. *Pods* oblong-lanceolate, acuminate at the ends, slightly curved, 3–4-seeded.—DISTRIB. Europe (Arctic), N. Asia.

SECTION 3. **Vic'ia** proper. Annual, rarely perennial. *Leaflets* many. *Flowers* few, sessile, or on very short pedicels. *Style* villous below the stigma on the outer side.

* *Leaflets many. Calyx gibbous at the base.*

6. **V. se'pium,** *L.*; perennial, flowers racemose, calyx-teeth unequal shorter than the tube, pod stipitate linear glabrous.

Hedges, copses, &c., ascending to near 2,000 ft. in Yorkshire; fl. May–July. —Slightly hairy. *Rootstock* creeping, stoloniferous. *Stem* 2–3 ft., climbing or trailing. *Leaves* 2–5 in.; leaflets in 6–8 pairs smaller upwards, lowest ¾–1 in., ovate, acute obtuse or truncate, mucronate, membranous; stipules ½-sagittate. *Racemes* ½–¾ in., 2–6-flowered, subsessile; pedicels shorter than the calyx-tube. *Flowers* ½–⅝ in., dull pale purple. *Pod* linear, 1 in., beaked, black, 6–10-seeded. *Seed* with a linear hilum.—DISTRIB. Europe (Arctic), Siberia, W. Asia.

7. **V. lu'tea,** *L.*; annual, flowers solitary sessile, upper calyx-teeth shorter lower longer than the tube, pod shortly stipitate hairy.

Rocky and pebbly places, especially on the E. coast, from Ayr and Kincardine southwards; absent from Ireland; fl. June–Aug.—Sparingly hairy. *Rootstock* short. *Stems* 6–18 in., tufted, prostrate. *Leaves* 1–2 in.; leaflets ¼–½ in., 5–7 pairs, linear-oblong, obtuse, mucronate; stipules small, ovate, acute, lower ½-hastate. *Flowers* rarely in pairs, suberect, pedicels shorter than the calyx-tube. *Flowers* ¾–1 in., narrow, pale yellow. *Pod* 1–1½ in., hairy,

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narrow, oblong, acuminate at both ends, beaked, 4–8-seeded. *Seeds* with a short hilum.—DISTRIB. Europe from Holland southwards, N. Africa, W. Asia.

Sub-sp. LÆVIGA'TA, *Sm.* (sp.), which differs from the type by its glabrous standard and pod, once found on the beach at Weymouth, is now extinct.

8. **V. sati'va,** *L.*; annual, flowers 1–2 axillary subsessile, calyx-teeth nearly equal as long as the tube, pod sessile silky.

Hedges and roadsides, but usually the remains of cultivation; ascends to upwards of 1,000 ft. in the Highlands; fl. April–June.—Annual, sparsely hairy. *Stems* many, trailing or climbing, stout in the cultivated form, slender in the wild. *Leaflets* variable, in 5–6 pairs, ⅛–¾ in., ⅟₁₆–½ in. broad. *Stipules* ½-hastate, toothed or entire, often with a dark blotch. *Pods* 1–3 in., linear, 4–10-seeded, slightly hairy, broadest in the cultivated forms. *Seeds* variable in size and colour, small in the wild state, smooth; hilum linear.—DISTRIB. Europe, N. Africa, W. Asia to India, N. America.—The typical form is only known as a cultivated plant.

Sub-sp. *sati'va* proper; stout, leaflets linear-obovate obtuse truncate or excised at the tip, nerve long-awned, flowers ¾ in. pale purple, pods 2–3 in. ascending imperfectly septate, seeds ⅛ in. diam.—Occurs as a relic of cultivation.

Sub-sp. ANGUSTIFO'LIA, *Roth* (sp.); leaflets acute or obtuse, flowers ½–¾ in. red or dark purple, pods 1–2 in. spreading, seeds ⅛ in. diam.—VAR. 1, *segeta'lis,* Koch (sp.); stout, leaflets of upper leaves oblong, flowers usually in pairs, pods 1½–2 in. bursting the calyx.—VAR. 2, *Bobar'tii,* Forst. (sp.); slender, leaflets of upper leaves narrow, flowers usually solitary, pod 1–1½ in. not bursting the calyx. *V. angustifo'lia,* Sm.—DISTRIB. Europe, N. Africa, N.W. India.

** *Leaflets few. Calyx not gibbous at the base.*

9. **V. lathyroi'des,** *L.*; annual, flowers solitary sessile, calyx-teeth equal nearly as long as the tube, pod sessile glabrous.

Dry pastures and roadsides, local from Moray and Ross southwards; S. and E. of Ireland, very rare; fl. May–June.—Hairy. *Stems* 6–8 in., spreading, slender. *Leaves* ½–1 in.; leaflets ⅛–⅜ in., 2–3 pair, linear-oblong or obovate, acute obtuse or notched; stipules ½-sagittate; tendrils simple or 0. *Flowers* ¼–⅓ in., lilac. *Calyx* funnel-shaped; teeth subulate. *Pods* ½–1 in., linear, tapering at both ends, beaked, 8–12-seeded. *Seeds* obtusely angled, granulate; hilum very short.—DISTRIB. Europe, N. Africa, W. Asia.

10. **V. bithyn'ica,** *L.*; perennial, peduncles 1- rarely 2-3-flowered, pedicels as long as the calyx, calyx-teeth unequal subulate, pod shortly stipitate reticulate hairy.

Bushy sea-cliffs, rare and local, from Flint and York, southwards; fl. May–June.—*Stems* 1–2 ft., many from the root, glabrous, except at the tips, trailing or climbing, flexuous. *Leaves* 1½–2 in., exclusive of the tendril; leaflets variable, ⅜–2½ in., ⅛–⅓ in. broad, obtuse and mucronate or acute or acuminate; stipules large, ½-sagittate; tendrils elongate, branched. *Peduncles* ½–3 in., and pedicels hairy. *Flowers* ¾ in., pale purple, wings paler. *Calyx* hairy, longer than the tube, very slender. *Pod* the largest of the British species, 1½ in. by ⅓ in. broad, abruptly beaked, 4–6-seeded. *Seeds* large, ⅛ in. diam., dark-brown.—DISTRIB. W. and S. Europe, N. Africa.

VAR. 1, *latifo'lia,* Syme; leaflets ovate or oblong, stipules all toothed.—VAR. 2, *angustifo'lia,* Syme; leaflets linear acuminate, upper stipules sparingly toothed.

17. LATH'YRUS, *L.* EVERLASTING PEA, BITTER-VETCH.

Herbs with the habit of *Vicia*, but fewer leaflets, petals broader, staminal tube obliquely truncate, and the style flattened and longitudinally bearded on its inner face.—DISTRIB. of *Vicia;* species 100.—ETYM. An old Greek name.

SECTION 1. **Aph'aca,** annual. *Stipules* leaf-like. *Leaves* reduced to tendrils. *Calyx-tube* equal at the base, shorter than the teeth.

1. **L. Aph'aca,** *L.* ; stipules ovate-hastate acute or obtuse, peduncles elongate 1-flowered, flowers erect.

Cornfields, &c. from Warwick, Lincoln, and Cambridge southwards; a colonist, *Watson;* fl. June–July.—Glabrous. *Stems* 1–3 ft., trailing. *Leaflets* chiefly seen on seedlings, then oblong, when developed on older plants linear ½–¾ in. ; stipules ½–1 in. broad, quite entire, striated with nerves. *Peduncles* slender, stout and 2–3 in. in fruit ; pedicel ¼ in., with a minute bract at its base. *Flowers* ½ in., pale yellow. *Calyx-lobes* green, linear, nearly as long as the corolla. *Pod* 1–1½ in., ¼ in. broad, ascending, slightly falcate, beaked, reticulate, 6–8-seeded.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia to India.

SECTION 2. **Nisso'lia.** Annual. *Stipules* minute, setaceous ; tendrils 0. *Petioles* leaf-like (phyllodes). *Calyx* rather gibbous at the base.

2. **L. Nisso'lia,** *L.* ; phyllodes grass-like, peduncles very slender 1-flowered, flowers erect.

Grassy bushy places from Derbyshire southwards, and as an escape north of it ; fl. May–June.—Glabrous. *Stems* 1–3 ft., ascending, very slender. *Phyllodes* 3–6 in., quite entire ; nerves many, parallel. *Peduncles* 1–4 in., pedicel as long as the calyx ; bracts obsolete. *Flowers* ½ in., crimson. *Calyx-teeth* lanceolate, lower teeth longest. *Pod* 1–2 in., very slender, slightly compressed, glabrous. *Seeds* granulate.—DISTRIB. W. and S. Europe from Holland southwards, N. Africa.

SECTION 3. **Lath'yrus** proper. *Petioles* all with leaflets and tendrils. *Calyx* gibbous at the base.

* *Leaflets one pair. Flowering peduncles longer than the leaves.*

3. **L. hirsu'tus,** *L.* ; stem winged, leaflets linear-lanceolate, stipules small ½-sagittate, peduncles 1–3-flowered, calyx-teeth ovate-lanceolate longer than the tube, pods tubercled densely silky, seeds papillose.

Fields in Surrey and Essex, very rare ; a colonist, *Watson;* fl. June–July.—Annual, almost glabrous except the pod. *Stems* 2–4 ft., angled and 2-winged, wings herbaceous, ⅛ in. broad. *Leaves* scattered ; petioles ¼–½ in. ; tendrils stout, branched ; leaflets 1–2½ in., nerves parallel ; stipules with long subulate auricles. *Peduncles* 2–3 in. ; flowers 2, distant, pedicels as long as the calyx, hairy ; bracts minute, subulate. *Flowers* ½ in. ; standard crimson, keel and wings paler. *Calyx-tube* short, obconic. *Pod* 1½–2 in., ⅓ in. broad, stipitate, dilated upwards, 8–10-seeded.—DISTRIB. W. and S. Europe from Belgium southwards, N. Africa.

4. **L. praten'sis,** *L.* ; stem acutely angled, leaflets lanceolate, stipules very large lanceolate, sagittate, peduncles 3–12-flowered, calyx-teeth subulate as long as the tube, pod glabrous or hairy, seeds smooth.

Hedges, copses, and meadows; ascending to near 1,600 ft. in the Highlands; fl. June–Sept.—Glabrous or slightly hairy. *Rootstock* creeping. *Stems* 1–2 ft., trailing or climbing. *Leaflets* ½–1 in., nerves indistinct; stipules with spreading subulate auricles, petioles ½–¾ in.; tendrils short. *Peduncles* longer than the leaves; pedicels as long as the calyx-tube, hairy; bracts setaceous. *Flowers* ½–¾ in., racemose, bright yellow. *Pods* 1–1½ in., sessile, linear, acuminate, many-seeded.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya; introd. in N. America.

L. TUBERO'SUS, *L.*; stem angled, leaflets obovate, stipules large ½-sagittate, peduncles 2–5-flowered, calyx-teeth triangular as long as the tube, pod glabrous.

Cornfields, Chipping Ongar; a denizen, *Watson;* fl. June–Aug.—Glabrous. *Rootstock* creeping, rootlets with small tubers. *Stem* 2–4 ft., climbing and trailing. *Leaflets* 1–1½ in., nerves diverging; petioles and tendrils stout. *Peduncles* very long; pedicels longer than the calyx; bracts subulate. *Flowers* ¾ in., racemose, crimson. *Calyx-tube* broad.—DISTRIB. Europe, N. Africa.—Root tubers edible.

5. **L. sylves'tris,** *L.*; stem winged, leaflets large ensiform, stipules falcate ½-sagittate, peduncles 3–10-flowered, calyx-teeth triangular, upper shorter than the tube, pod glabrous, seeds faintly remotely tubercled.

Rocky thickets and hedges, local, often an escape, from Mull and Forfar southwards; absent from Ireland; fl. June–Aug.—Glaucous, glabrous. *Rootstock* creeping. *Stem* 3–6 ft., wings herbaceous. *Leaflets* 4–6 in., ¼–½ in. broad; nerves parallel; stipules large, falcate, with long lanceolate auricles; petioles winged or not; tendrils slender, branched. *Peduncles* 4–6 in., pedicels longer than the calyx; bracts filiform. *Flowers* ¾–1¼ in., racemed; standard rosy; wings purplish. *Calyx-tube* broad, short. *Pod* 2–3 in., sessile, narrowly winged above, 10–14 seeded.—DISTRIB. Europe (Arctic), N. Africa.—Very near the garden Everlasting Pea, which occurs here and there as an escape.

** *Leaflets 2 or more pairs. Flowering peduncles longer or shorter than the leaves.*

6. **L. palus'tris,** *L.*; stem winged, leaflets 2–3 pair sword-shaped, stipules lanceolate ½-sagittate, peduncles usually longer than the leaves 2–6-flowered, pod compressed glabrous.

Boggy meadows and copses, from York, and Carnarvon to Somerset and Suffolk, local; N. and Mid. Ireland, very rare; fl. June–Aug.—Glaucous, glabrous. *Rootstock* creeping. *Stems* 2–4 ft., climbing or trailing, wings herbaceous. *Leaflets* 2–3 pair, 2–3 in., nerves parallel; tendril rather short, branched; stipules ¾ in. *Peduncles* 1–4 in.; pedicels shorter than the calyx-tube; bracts minute. *Flowers* ½–¾ in., pale blue-purple. *Calyx-tube* short. *Pod* 1½–2 in., stipitate, reticulate, 6–8-seeded. *Seeds* smooth.—DISTRIB. Europe (Arctic), N. Asia, E. and W. N. America.

7. **L. marit'imus,** *Bigelow;* stem angled, leaflets 3–5 pair oblong, stipules ovate ½-hastate, peduncles usually shorter than the leaves 5–10-flowered, pod turgid glabrous. *Pisum maritimum,* L.

Pebbly beaches, very rare and local; Orkney, Shetland, Lincoln, Suffolk, Kent, Sussex, and Dorset; Kerry only in Ireland; fl. June–Aug.—Glaucous, glabrous. *Rootstock* long, stout, black. *Stems* 1–3 ft., creeping at the base, prostrate. *Leaflets* 1–2 in., alternate or subopposite, nerved, upper gradually

smaller; petioles 2–4 in.; tendrils short; stipules nearly 1 in. *Peduncles* stout; pedicel shorter than the calyx; bracts minute. *Flowers* ¾–¾ in., purple, fading to blue. *Pods* 1½–2 in., reflexed, straight, 6–8-seeded. *Seeds* smooth. DISTRIB. Arctic and Northern Europe, Asia, and America.

VAR. 1, *maritimus* proper; leaflets broadly oblong obtuse. Pebbly beaches, S. and E. coast, local, at intervals from Lincolnshire to Cornwall; Kerry.—VAR. 2, *acutifolius*, Bab.; slender, straggling, leaves elliptic-lanceolate acute. Shetlands and Orkneys.

SECTION 4. **Or'obus,** *L.* (gen.). Perennial. *Petioles* ending in a short point without tendrils. *Calyx* gibbous at the base.

8. **L. macrorrhi'zus,** *Wimmer;* stem simple winged, leaflets 2–4 pairs, stipules ½-sagittate usually toothed below. *Or'obus*, L.

Copses and thickets, &c., ascending to 2,100 ft. in the Highlands; fl. June–Aug.—Glabrous or very slightly hairy. *Rootstock* creeping and forming tubers. *Leaflets* 1–2 in., ¾–1½ in. broad, nerves parallel in the narrow forms, diverging in the broad; petioles ½–1½ in.; stipules ¼ in., rarely quite entire, very variable. *Peduncles* slender, as long as or longer than the leaves, 2–6-flowered; pedicels shorter than the calyx; bracts minute. *Flowers* ½–¾ in., lurid crimson, fading to green or blue. *Calyx-teeth* triangular, shorter than the tube, upper very short. *Pod* subcylindric. *Seeds* globose.—DISTRIB. Europe.

VAR. 1, *macrorrhizus* proper; leaflets elliptic oblong, acute or obtuse. *Or'obus tuberosus*, L.—VAR. 2, *tenuifolius*, Roth. (sp.); leaflets sword-shaped or narrow-linear.

9. **L. ni'ger,** *Wimmer;* stem angled, leaflets 3–6 pairs, stipules linear-lanceolate acute. *Orobus*, L.

Rocky subalpine Scotch valleys; Den of Airly, Pass of Killiecrankie, Craiganain near Moy House; ascending probably to 1,200 ft.; fl. June–Aug.—Glabrous, brown, black when dry. *Rootstock* short. *Stems* 1–2 ft., erect, branched, stout or slender. *Leaflets* ¾–1¾ in., oblong-lanceolate, acute or mucronate, nerves diverging; petioles 1–2 in.; stipules ⅛–¼ in., very narrow. *Peduncles* shorter or longer than the leaves, 2–8-flowered, pedicels about as long as the calyx; bracts filiform or obsolete. *Flowers* ½ in., livid-purple fading to blue. *Calyx-teeth* very short, triangular. *Pods* 2 in., narrow, turgid, rugose, acuminate at both ends, 6–8-seeded, almost septate. *Seeds* compressed, obtusely angled.—DISTRIB. Europe.

ORDER XXVII. **ROSA'CEÆ.**

Herbs, shrubs, or trees. *Leaves* alternate, rarely opposite, simple or compound, stipulate. *Inflorescence* various. *Flowers* regular. *Calyx* superior or inferior; lobes 5, the 5th next the axis, imbricate in bud. *Petals* 5, rarely 0, inserted under the margin of the disk, often orbicular and concave, claws very short or 0, deciduous, imbricate. *Stamens* many, rarely 1 or few, inserted with the petals or on the disk, 1–many-seriate, incurved in bud; anthers small, usually didymous. *Disk* lining the calyx-tube. *Carpels* 1 or more, free or connate or adnate to the calyx-tube; styles as many, free or connate, terminal ventral or basal, stigma simple rarely feathery or decurrent; ovules 1 or 2 collateral in each carpel, rarely more, anatropous, pendulous with a ventral raphe, or ascending with a dorsal one. *Fruit* various, a pome, or of one

or many drupes, achenes or follicles, rarely a berry or capsule. *Seeds* ascending or pendulous, testa coriaceous or membranous, albumen scanty or 0; cotyledons plano-convex, radicle short.—DISTRIB. Ubiquitous; genera 71; species 1,000. — AFFINITIES with *Leguminosæ* and *Saxifragæ.* —PROPERTIES astringent in *Potentilleæ* and *Roseæ.* Hydrocyanic and malic acids are secreted in *Pruneæ* and *Pomeæ.*

SERIES 1. *Ripe carpels not enclosed within the calyx-tube.*

TRIBE I. **PRUNE'Æ.** *Calyx* deciduous. *Carpel* 1; ovules 2, pendulous. Fruit a drupe .....1. Prunus.

TRIBE II. **SPIRE'Æ.** *Calyx* persistent, ebracteolate. *Carpels* 5 or more; ovules 2 or more in each carpel, pendulous. *Fruit* a follicle.....2. Spiræa.

TRIBE III. **RUBE'Æ.** *Calyx* persistent, ebracteolate. *Carpels* many; ovules 2 in each carpel, pendulous. *Fruit* of many small drupes.....3. Rubus.

TRIBE IV. **POTENTIL'LEÆ.** *Calyx* persistent, bracteolate. *Carpels* 4 or more; ovule 1 in each carpel, ascending. *Fruit* of 4 or more achenes.

* *Style elongating after flowering.*

Leaves simple. Scape 1-flowered. Styles of achenes feathery.....4. Dryas.
Leaves pinnate. Scape several-flowered.....5. Geum.

** *Style not elongating after flowering.*

Leaves 3-foliolate. Achenes on a fleshy receptacle.....6. Fragaria.
Leaves 3-many-foliolate. Achenes on a dry receptacle .....7. Potentilla.

SERIES 2. *Ripe carpels enclosed within the calyx-tube.*

TRIBE V. **POTERIE'Æ.** *Petals* 4, 5, or 0. *Carpels* 1–3; ovules 1 in each carpel, erect or pendulous. *Fruit* of 1–3 achenes enclosed in the small dry calyx-tube.

Calyx 4–5-lobed, with 4–5 adnate bracts. Petals 0.....8. Alchemilla.
Calyx 5-lobed. Petals 5. Stamens 12–20 .....9. Agrimonia.
Calyx of 4 petaloid lobes. Petals 0. Stamens 4–30.....10. Poterium.

TRIBE VI. **ROSE'Æ.** *Petals* 4–5. *Carpels* many; ovules 1 in each carpel, pendulous. *Fruit* of many achenes enclosed in the fleshy calyx-tube. 11. Rosa.

TRIBE VII. **POME'Æ.** *Petals* 5. *Carpels* 1–5; ovules 2 collateral in each carpel, pendulous. *Fruit* fleshy, 1- 2- or 5-celled.

Fruit 2–5-celled, cells with cartilaginous walls.....12. Pyrus.
Fruit a drupe with 1–5 included stones .....13. Crataegus.
Fruit a drupe with 3–5 bony ½-exserted stones.....14. Cotoneaster.

1. PRU'NUS, *L.* PLUM AND CHERRY.

Shrubs or trees. *Leaves* alternate, simple, glandular-serrulate; petiole 2-glandular. *Flowers* white or red, solitary corymbose, or racemed. *Calyx* deciduous; lobes 5, imbricate. *Petals* 5. *Stamens* 15–20, perigynous, filaments free. *Carpel* 1; style terminal; ovules 2, collateral, pendulous. *Drupe* with an indehiscent or 2-valved, 1-seeded, smooth, or rugged stone. *Seed* pendulous, testa membranous, albumen scanty or 0.—DISTRIB. N. temp. regions, rare in the tropics; species 80.—ETYM. The old Latin name.

SECTION 1. **Pru'nus** proper. *Leaves* convolute in bud. *Flowers* solitary or fascicled, appearing with the leaves or before them. *Drupe* glaucous.

1. **P. commu'nis,** *Huds.*; leaves ovate or oblong-lanceolate pubescent

beneath when young, petals obovate-oblong, flesh of drupe adhering to the stone.

Copses, hedges, &c., ascending to 1,300 ft. in Yorkshire ; fl. March–April.—A small, rigid, much-branched shrub, 3-8 ft.; branches usually spinescent; wood very hard and tough. *Leaves* petioled, ¾–2 in., variable in breadth, acuteness, and length of petiole. *Flowers* white, shortly pedicelled. *Petals* variable in breadth. *Drupe* globose.—DISTRIB. Europe, W. Asia.—The Sloe is confined to Europe, the Bullace extends to N. Africa and eastwards to the Himalaya.

Sub-sp. SPINO'SA, *L.* (sp.); bark black, branches divaricate all spinescent, leaves finely serrulate at length glabrous beneath, flowers ½–¾ in. diam. preceding the leaves, pedicels solitary or in pairs glabrous, petals obovate, drupe ½ in. diam. black erect very austere. *Sloe, Blackthorn.*

Sub-sp. INSITI'TIA, *L.* (sp.); bark brown, branches straight a few spinescent, leaves larger broader more obtusely serrate pubescent beneath, peduncles downy, petals broader, drupe ¾–1 in. diam. globose drooping black or yellow.—Doubtfully wild in Scotland, where it does not extend N. of Dumfries.—*Bullace.*

Sub-sp. *domestica*, L. (sp.); bark brown, branches straight unarmed, leaves pubescent on the ribs beneath, peduncles glabrous, drupe 1–1½ in. diam. black.—Not indigenous. *Wild Plum.*

SECTION 2. **Cer'asus.** *Leaves* conduplicate in bud. *Flowers* solitary or fascicled, appearing with the leaves or after them.

2. **P. Cer'asus,** *L.*; leaves elliptic or obovate-oblong abruptly acuminate irregularly crenate-serrate, flowers in subsessile umbels, calyx-tube turbinate, lobes entire or serrate, petals orbicular. *Dwarf Cherry.*

Hedges, thickets, and copses, from Cumberland southwards; rare in Ireland ; a doubtful native ; fl. May.

Sub-sp. CER'ASUS proper ; shrubby, leaves firm erect, peduncles strict, calyx-tube not contracted at the mouth, lobes obtuse serrated, petals spreading horizontally.—A denizen? *Watson.*

Sub-sp. 2, A'VIUM, *L.* (sp.); a tree, leaves flaccid drooping, peduncles drooping, calyx-tube contracted at the top, lobes subacute serrate, petals suberect. —A native? *Watson.—Gean.*

I follow Bentham and the "London Catalogue' in combining these species, which are kept apart by Babington, Syme, and Hewett Watson, and with a doubt in the "British Flora." The Dwarf Cherry forms a bush with copious suckers, redder bark, shorter petioled less acuminate and more coarsely unequally serrated leaves, and with the umbels developed at the tops of the flower-buds, and it bears a juicy, red, acid cherry. The Gean is a small tree, with few or no suckers, the umbels produced laterally on the leaf-buds, and the drupe is more often black and bitter. The Dwarf Cherry is the supposed origin of the Garden Cherry, and the Gean of the Morella. DISTRIB. of both : Europe, W. Asia to the Himalaya.—The Gean is found farthest north, and also in N. Africa.

SECTION 3. **Laurocer'asus.** *Leaves* conduplicate in bud. *Flowers* in axillary or terminal racemes, appearing after the leaves.

3. **P. Pa'dus,** *L.*; leaves elliptic or obovate acutely doubly serrate. *Bird Cherry.*

Copses and woods, from Sutherland southwards; ascending to 1,500 ft. in Yorkshire; fl. May.—A tree, 10–20 ft. *Leaves* 2–4 in., unequally cordate at the base, axils of the nerves pubescent; stipules linear-subulate, glandular-serrate. *Racemes* 3–5 in., from short lateral buds, lax-flowered. *Flowers* ½–¾ in. diam., white, erect, then pendulous; pedicels ¼ in., erect in fruit; bracts deciduous, linear. *Calyx-lobes* obtuse, glandular-serrate. *Petals* erose. *Drupe* ⅓ in., ovoid, black, bitter; stone globose, rugose.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya.

2. SPIRÆ'A, *L.*

Perennial herbs or shrubs. *Leaves* alternate, simple or compound; stipules free or adnate to the petiole, rarely 0. *Flowers* in axillary or terminal cymes, white or red. *Calyx* persistent, lobes 4–5, imbricate or valvate in bud. *Petals* 4–5. *Stamens* 20–60, filaments free or connate below. *Disk* fleshy, often hairy. *Carpels* 5 or more, free or connate below; styles subterminal; ovules 2 or more, pendulous. *Follicles* 5 or more, few-seeded.—DISTRIB. Temp. and cold regions of the N. hemisphere; species 50.—ETYM. doubtful.

1. **S. Ulma'ria,** *L.*; herbaceous, leafy, leaves interruptedly pinnate serrate white and downy beneath, terminal segments large acutely lobed, cymes corymbose very compound, carpels glabrous twisted 2-ovuled. *Meadow-sweet, Queen of the Meadows.*

Meadows and water-sides; ascending to 2,700 ft. in the Highlands; fl. June–Aug.—*Rootstock* short. *Stems* 2–4 ft., erect, furrowed. *Radical leaves* 1–2 ft.; terminal leaflets 1–3 in.; lateral entire, alternate very small; stipules leafy, ½-ovate, toothed. *Cymes* 2–6 in. diam., pubescent. *Flowers* ⅓–½ in. diam., white. *Calyx-lobes* reflexed. *Carpels* 5–9, twisted together into an almost horizontal plane.—DISTRIB. Europe (Arctic), Siberia, Dahuria, Iceland.

2. **S. Filipen'dula,** *L.*; herbaceous, leaves interruptedly pinnate glabrous, leaflets sessile deeply cut serrate, cymes panicled, carpels pubescent straight 2-ovuled. *Dropwort.*

Dry pastures, from Fife and Forfar southwards; ascending to 1,200 ft. in Yorkshire; W. of Ireland, very local; fl. June–July.—*Rootstock* short; root-fibres interruptedly tuberous. *Stem* 2–3 ft., erect, grooved, with few small leaves. *Leaves* 4–10 in., chiefly radical; leaflets ⅛–½ in., very many, almost pinnatifid, sessile by a broad base, alternate very small, terminal 3-lobed; stipules of cauline leaves toothed. *Cymes* loose; peduncles slender. *Flowers* ¼–⅓ in. diam., white or rosy outside. *Calyx-lobes* obtuse. *Carpels* 6–12, erect.—DISTRIB. Europe, N. Africa, N. Asia.

S. SALICIFO'LIA, *L.*; shrubby, leaves oblong-lanceolate serrate glabrous, stipules 0, cymes terminal racemose, carpels glabrous many-ovuled.

Moist plantations, not indigenous; fl. July–Aug.—*Stems* 3–5 ft., stoloniferous. *Leaves* 2–3 in., equally or unequally serrate. *Cymes* dense, subcylindric. *Flowers* rosy or pink. *Carpels* 5.—DISTRIB. Europe (Arctic), N. Asia, N. America.

3. RU'BUS, *L.* BRAMBLE, RASPBERRY, &c.

Creeping herbs or sarmentose shrubs, almost always prickly. *Leaves* alternate, simple or compound; stipules adnate to the petiole. *Flowers* in

terminal and axillary corymbose panicles, rarely solitary, white or red. *Calyx-tube* broad; lobes 5, persistent. *Petals* 5. *Stamens* many. *Disk* coating the calyx-tube. *Carpels* many, on a convex receptacle; style subterminal; ovules 2, collateral, pendulous. *Drupes* many, 1-seeded, crowded upon a dry or spongy conical receptacle. *Seed* pendulous.—DISTRIB. Abundant in the N. hemisphere, rare in the Southern; species 100.—ETYM. The old Latin name.

* *Stem herbaceous or almost so.*

1. **R. Chamæmo'rus,** *L.*; stem erect unarmed 1-flowered, leaves few suborbicular-cordate obtusely 5–7-lobed, flowers diœcious. *Cloudberry.*

Peaty alpine and subalpine moors from Derby and Wales northwards; ascending to 3,200 ft. in the Highlands; N. of Ireland, very rare; fl. June–July.—Pubescent. *Rootstock* creeping, branched. *Stem* 4–8 in., simple, sheathed below by obtuse leafless stipules. *Leaves* few, 1–3 in. diam., petioled, crenate, plaited, rugose; stipules ovate, obtuse. *Flowers* 1 in. diam., white. *Sepals* oblong, obtuse, unequal, villous. *Petals* oblong. *Fruit* ½ in., orange-yellow; drupes few, large, persistent, stone smooth.—DISTRIB. N. Europe (Arctic), Siberia, E. and W. N. America.—Berry very grateful, fresh or preserved.

2. **R. saxat'ilis,** *L.*; barren-stems procumbent unarmed or with scattered bristles, flowering shorter erect, leaves 3-foliolate, petals very small.

Stony banks of subalpine rivulets, copses, &c. from S. Wales and Gloucester northward; ascending to 2,700 ft. in the Highlands; common in Ireland; fl. June–July.—Softly pubescent. *Rootstock* creeping, stoloniferous. *Stems* simple, with leafless obtuse stipules below; leafing 2–3 ft., flowering 6–18 in. *Leaves* few; leaflets 1–3 in., green, membranous, lateral shortly petioled, rhomboid-ovate, obscurely lobed, sharply doubly toothed; stipules linear. *Flowers* ½ in. broad, few, white; peduncles terminal, very short. *Calyx-lobes* ovate. *Petals* linear-obovate. *Drupes* 2–3, globose, scarlet, persistent, stone reticulate.—DISTRIB. Europe, Siberia, Dahuria, W. Asia to the Himalaya.

** *Stem shrubby, with many suckers. Leaves pinnately 3–5-foliolate.*

3. **R. Idæ'us,** *L.*; prickles of the stem straight slender, of the flowering shoots curved, leaflets ovate or elliptic acuminate white and hoary beneath, flowers drooping, petals short, drupes deciduous. *Raspberry.*

Woods, most frequent in mountain districts; ascending to near 2,000 ft. in the Highlands; fl. June–Aug.—*Rootstock* short. *Stems* 3–5 ft., erect, biennial, terete, pruinose. *Leaves* variable; leaflets 3–5 in., acutely irregularly serrate; stipules adnate half-way, subulate. *Cymes* ⅛ in. diam., few-flowered, axillary and terminal, white. *Calyx-lobes* ovate-lanceolate, tips long. *Petals* linear-obovate. *Drupes* many, red or yellow, hoary, stone pitted.—DISTRIB. Europe (Arctic), N. Africa? Siberia to Kamtschatka, W. Asia.—*R. Lecsii,* Bab. (sp.), is a state with crowded shorter leaflets (Bab. *Brit. Rubi,* p. 47), found in Devon and Somerset.

*** *Stem shrubby, without suckers. Leaves 3–5-foliolate, rarely pinnate.*

4. **R. fruticosus,** *L.*; stem prickly, flowers in panicled or racemed corymbs or fascicles. *Blackberry, Bramble.*

Abundant everywhere, copses, hedges, &c., ascending to near 1,000 ft. in Yorkshire; fl. July–Sept.—*Stem* glabrous or with bristles and gland-tipped hairs in various proportions, best marked on the flowerless shoots, which are sub-

erect, or arched and rooting from a callus at the tip, thus giving rise to innumerable individuals. *Leaves* usually pinnately 3–5-foliolate, subpersistent, glabrous or pubescent; leaflets on long or short petioles, overlapping or not, obovate or rhomboid-ovate, coarsely irregularly serrate or toothed, convex, dark green above, paler often glaucous below. *Flowers* white or pink, in terminal racemes, the lateral branches corymbose or elongate. *Drupes* black or red-purple.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to Upper India.

For the following arrangement of the British forms of *R. fruticosus* I am indebted to Mr. J. G. Baker.

* *Stems with scattered uniform prickles, quite glabrous,* i.e. *without bristles or gland-tipped hairs.*

Sub-sp. SUBERECTUS, *Anderson* (sp.); barren shoots suberect not rooting at the tip, leaflets large membranous bright green glabrous or slightly hairy beneath, sepals green with distinctly marked white edges, drupes numerous claret-coloured or black. *R. umbrosus*, Lees.—Copses, especially in the north. One of the best-marked forms.—VAR. *plicatus*, W. and N. (sp.), has larger and more hooked prickles than the type.—VAR. *fissus*, Lindl., has copious small prickles, leaflets more hairy beneath, sepals sometimes appressed to the fruit.—VAR. *affinis*, W. and N. (sp.), (*lentiginosus*, Lees, a form), is a connecting link with sub-sp. *rhamnifolius*.

Sub-sp. RHAMNIFOLIUS, *W.* and *N.* (sp.); barren stem arched angular rooting at the tip not glaucous, leaflets often large cordate and reflexed, more finely toothed than in the two following sometimes white and tomentose beneath, sepals not distinctly bordered with white, fruit large black juicy.—From Mid. Scotland southwards.—VAR. *Lindleianus*, Lees; prickles more copious and straight, leaflets narrower, panicle more open.—VARS. *incurvatus*, Bab. (sp.), and *imbricatus*, Hort., have no decided characters; *R. Grabowskii*, Weihe, of which one plant alone is known, and *R. Colemanni*, Bloxam, are intermediate between this sub-sp. and *infestus*; *R. macrophyllus*, var. *glabratus*, Bab., belongs here.

Sub-sp. CORYLIFOLIUS, *Smith* (sp.); barren stem between arched and prostrate rooting at the tip not glaucous, leaflets 5 membranous hazel-like imbricate, sepals densely tomentose all over the back, drupes few large.—From S. of Scotland southwards. *R. sublustris*, Lees; *R. conjungens*, and *R. purpureus*, Bab. —The type has terete stems and many small slender prickles.—VAR. *Balfourianus*, Blox. (sp.), and *althæifolius*, Bab. not Host., have sepals appressed to the fruit; the former approaches *cæsius* by its corymbose inflorescence.—VAR. *latifolius*, Bab. is a rare form intermediate between this sub-sp. and the last.

Sub-sp. CÆSIUS, *L.* (sp.); stem prostrate glaucous, prickles more unequal setaceous, leaflets usually 3 green on both surfaces, sepals densely tomentose all over the back appressed, drupes few large glaucous. —Hedges and thickets from Perth southwards; ascends to near 1,000 ft. in Yorkshire.—*Newberry.*—Often a well-marked form from its glaucous character. *R. tenuis*, Bell Salter, *ulmifolius*, *intermedius*, and *hispidus* are indistinguishable forms; *R. pseudo-idæus*, Lejeune, is probably a hybrid with *R. Idæus*.

** *Stem with equal scattered prickles, pubescent or hairy, but with few or no gland-tipped hairs or bristles, arching and rooting at the tip. Calyx densely tomentose, white, eglandular.*

Sub-sp. DISCOLOR, *W.* and *N.*; stem with appressed stellate pubescence, prickles strong, leaflets small more persistent than in any other, bright

green above densely tomentose and white beneath, flowers pink, sepals always reflexed, drupes small with little flesh.—Abundant everywhere. —VAR. *thyrsoi'deus*, Wimmer; stem stronger and more arching, flowers white, leaflets larger less white beneath, pubescence of stem and leaves looser.—The stellate appressed or very short hairs of the stem distinguish this from all the following.

Sub-sp. LEUCOSTA'CHYS, *Smith* (sp.); stem angular between arching and prostrate with copious spreading hairs and sometimes a few glandular hairs, rachis of panicle densely villous, leaflets finely toothed densely pubescent often white below, terminal one roundish with a point, panicle thyrsoid compound, sepals reflexed, petals often deep red. *R. vesti'tus*, Weihe; *R. Leightonia'nus*, Bab.—Common.

Sub-sp. VILLICAU'LIS, *Weihe* (sp.); stem angular with copious spreading hairs but no glandular ones, rachis of panicle densely villous, leaflets finely toothed densely pubescent often white beneath, terminal roundish with a point, panicle thyrsoid compound, sepals reflexed, petals pale. *R. carpinifo'lius*, Bab. not Blox.; *R. pampino'sus*, Leos.

Sub-sp. RUBE'OLUS, *Weihe* (sp.); stem angular arching with no glandular hairs, spreading hairs few and deciduous, leaflets coarsely and irregularly toothed shortly grey-pubescent or finally subglabrous beneath, terminal one roundish with a point often cordate, panicle thyrsoid compound, rachis finely pubescent with copious strong red prickles, sepals reflexed, petals pale. *R. Salte'ri*, Bab.; *R. calva'tus*, Blox.—Connects this group with *rhamnifolius*.

Sub-sp. UMBRO'SUS, *Arrh.* (sp.); stem angular, hairs few and deciduous none glandular, leaflets sometimes 7 finely toothed finely grey-pubescent beneath, terminal roundish or obovate with a point, panicle thyrsoid compound, rachis finely pubescent, sepals reflexed, petals pale. *R. macrophyllus*, var. *umbrosus*, Bab.; *R. carpinifo'lius*, of many English writers, not Weihe.—Common.

Sub-sp. MACROPHYL'LUS, *Weihe* (sp.); stem angular, with a few spreading hairs and no glandular ones, leaflets coarsely and irregularly toothed finely grey-pubescent beneath, the terminal obovate or obovate-oblong with a point, panicle thyrsoid compound, rachis finely pubescent, sepals reflexed, petals pale. *R. Schlechtendahl'ii*, Weihe; *R. amplifica'tus*, Lees.

Sub-sp. MUCRONULA'TUS, *Boreau* (sp.); stem between arching and prostrate with a few spreading hairs and often a few glandular hairs, leaflets shortly grey-pubescent below, terminal roundish abruptly pointed, panicle sparse often subsimple, rachis densely villous its prickles few and weak, sepals reflexed, petals pale. *R. mucronatus*, Blox. not Seringe.—Local.

Sub-sp. SPRENGE'LII, *Weihe* (sp.); stem weak wide-trailing terete with a few spreading hairs and often a few glandular hairs, leaflets coarsely toothed finely and shortly grey-pubescent or finally subglabrous beneath, often only three on the fully-developed leaves, terminal obovate with a point, panicle broad sparse often subsimple, rachis finely pubescent with few prickles, sepals ascending often leaf-pointed, petals pink. *R. Borreri*, Salter; *R. rubicolor*, Blox.—A well-marked but local form.

*** *Stems with copious bristles and glandular hairs, prickles unequal, often very numerous.*

† *Leaves of the barren shoot 5-foliolate.*

Sub-sp. DUMETO'RUM, *Weihe* (sp.); stem between arching and trailing subcylindric sometimes pruinose, bristles few or many, hairs 0 or few on the

barren shoots, generally fewer on the rachis of the panicle than in all the following, leaflets broad finely grey-pubescent or subglabrous below, the two lateral pairs much imbricated, the toothing open but not deep, terminal suborbicular, sepals reflexed or ascending not leaf-pointed, petals broad, fruit of a few large drupes. *R. nemorosus* of many, scarcely of Hayne. The glandular representative of *corylifolius* in fruit, leaves, and prolonged flowering. *R. tuberculá'tus*, Bab., is a variety with subequal prickles, appressed sepals, few bristles and glandular hairs. *R. diversifo'lius*, Lindl., Bab., is a variety with more copious and irregular prickles and sepals mostly reflexed.—Common in hedges, very variable.

Sub-sp. RAD'ULA, *Weihe* (sp.); stem arching angular, prickles strong subequal, bristles and hairs and glands of barren stem copious, hairs few, leaflets not imbricated grey or often white-pubescent beneath, toothing moderately fine in the typical form, terminal leaflet obovate, sepals reflexed not leaf-pointed, petals broad.—*R. ru'dis*, Weihe, Bab., is a variety with stronger prickles and leaflets deeply and very irregularly toothed. *R. Leighto'ni* and *denticulá'tus*, Bab., are closely allied.—Common in hedges.

Sub-sp. BLOXA'MI, Lees (sp.); stem arching angular, prickles smaller than in the preceding subequal, hairs bristles and glands moderately numerous, leaflets not imbricated moderately coarsely toothed green finely pubescent beneath, terminal suborbicular often cordate, sepals reflexed not leaf-pointed, petals broad.—*R. sca'ber*, Weihe, Bab., *R. Babingto'nii*, Salter, is an allied form with stronger prickles and the panicle often very large and lax with patent branches.—*R. fusco-a'ter*, Weihe, Bab., is a rare form connecting this with *villicaú'lis*.—*R. Brigg'sii*, Blox., is an allied form with shortly petioled leaflets and appressed sepals.—Local.

Sub-sp. KOEHLE'RI, *Weihe* (sp.); stem trailing nearly terete, prickles very numerous irregular strongly hooked, bristles numerous, glandular and simple hairs few, leaflets not imbricate pubescence thin grey, toothing moderately coarse, terminal orbicular, sepals reflexed not leaf-pointed, petals broad.—*R. infes'tus*, Weihe, a variety with an arching stem, prickles and bristles much less dense.—Local.

Sub-sp. HYS'TRIX, *Weihe* (sp.); stem arching angular, prickles weak subequal, bristles glandular and simple hairs moderately numerous, leaflets not imbricate green thinly pubescent or finally glabrous below, terminal obovate, toothing fine, sepals ascending remarkably leaf-pointed, petals broad.—*R. Lejeu'nii*, Weihe, a variety with a large lax panicle with patent branches.—*R. rosa'ceus*, Weihe; a trailing variety with more irregular prickles and narrow petals.—Local.

Sub-sp. PAL'LIDUS, *Weihe* (sp.); stem angular wide-trailing, prickles small copious very unequal, bristles simple and glandular hairs copious, leaflets not imbricate finely toothed densely grey or sometimes white-pubescent below, terminal obovate, sepals reflexed not leaf-pointed, petals narrow.—*R. humifu'sus*, Weihe, Bab., and *R. folio'sus*, Weihe, Bab., are varieties with the leaves prolonged into the panicle.—*R. hir'tus*, Weihe (*fuscens*, Lees), is a closely allied form.—Common in woods.

†† *Leaves of barren shoot 3-foliolate.*

Sub-sp. GLANDULO'SUS, *Bell* (sp.); stem subterete trailing, prickles small straight weak, bristles simple and glandular hairs copious, leaves green thinly pubescent beneath, panicle thyrsoid compound, the bristles of the rachis very fine and copious, sepals ascending leaf-pointed densely bristly on the back, petals narrow. *R. Bellar'di*, Weihe.—*R. denta'tus*, Blox. is a variety

with less prickly rachis and sepals and membranous leaves green and nearly glabrous beneath.—*R. rotundifo'lius,* Blox., prickles stronger, leaves more hairy beneath, sepals less distinctly leaf-pointed.—Local.

Sub-sp. GUNTHER'I, *Weihe* (sp.); stem trailing terete, prickles small very unequal, bristles glandular and simple hairs much fewer than in the last, leaves densely shortly pubescent often white below, panicle compound, rachis very wavy, sepals reflexed not leaf-pointed, petals narrow.—Local.

Sub-sp. PYRAMIDA'LIS, *Bab.* (sp.); stem trailing clothed as in the last, leaves green thinly hairy beneath, panicle subracemose, rachis straight, sepals ascending leaf-pointed, petals narrow.—Wales and Devonshire.

Of *R. pygmæus,* Weihe, nothing is known satisfactorily.

4. DRY'AS, *L.*

Prostrate, tufted, scapigerous shrubs. *Leaves* simple, white beneath; stipules adnate to the petiole. *Flowers* solitary, large, white or yellow. *Calyx* persistent; lobes 8–9, valvate in bud. *Petals* 8–9. *Stamens* many, crowded; filaments free. *Disk* concave, hairy. *Carpels* many, sunk in the calyx-tube; style terminal; ovule 1, ascending. *Achenes* many; styles slender, feathery.—DISTRIB. Arctic and Alpine regions of N. temp. zone; species 2 or 3.—ETYM. δρύας, from the *Oak*-like foliage.

1. **D. octopet'ala,** *L.*; leaves oblong-ovate coarsely crenate-serrate. *D. depressa,* Bab.

Stony, chiefly limestone and mountain districts in Wales, Yorkshire, and Scotland, ascending to 2,700 ft.; N. and W. of Ireland; fl. June–July.—*Stem* tortuous, much branched. *Leaves* ½–1 in., crowded, obtuse, hoary beneath, shining above, margins reflexed, midrib hairy and scurfy; scape 1–3 in., glandular and hairy, longer in fruit. *Flowers* 1–1½ in. diam., white. *Sepals* about 8, woolly and with black glandular hairs, obtuse or subacute. *Petals* oblong. *Achenes* hispid; awn 1–2 in.—DISTRIB. that of the genus.

5. GE'UM, *L.* AVENS.

Erect perennial herbs. *Radical leaves* crowded, pinnate; terminal leaflet very large; stipules adnate to the petiole. *Flowers* solitary or corymbose, white yellow or red. *Calyx* persistent, with 5 bracteoles above its base; lobes 5, imbricate or valvate in bud. *Petals* 5. *Stamens* crowded. *Disk* smooth or with radiating grooves. *Carpels* many, receptacle short or long; style filiform, straight or bent; ovule 1, ascending. *Achenes* many, on a dry receptacle, ending in elongated, filiform, straight or bent styles which are often hooked at the tip.—DISTRIB. Temp. and cold regions of both hemispheres; species 30.—ETYM. γεύω, from the aromatic roots.

1. **G. urba'num,** *L.*; flowers erect, head of achenes sessile, awn with a short glabrous hook at the tip, calyx-lobes reflexed in fruit.

Borders of copses, hedgebanks, &c. from Ross and Elgin southwards, ascending to near 1,700 ft. in the Lake district; fl. June–Aug.—Softly hairy. *Stem* 1–3 ft. *Radical leaves* long-petioled, interruptedly pinnate; terminal leaflets 2–3 in. broad, suborbicular, obscurely lobed, crenate; lateral ¼–½ in., oblong, sessile; cauline leaves variable; stipules foliaceous, lobed and toothed. *Flowers* ½–¾ in. diam., yellow; peduncles slender. *Petals* obovate, spreading, as long as the acute calyx-lobes. *Achenes* hispid, spreading; awn ½ in.; receptacle hispid.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, E. and W. N. America.

2. **G. riva'le,** *L.*; flowers drooping, head of achenes stalked, awn jointed and hairy beyond the middle, calyx-lobes appressed in fruit.

By streams, in copses, &c., rare in the S. of England; ascends to near 2,800 ft. in the Highlands; fl. May–July.—*Stem* 1–1½ ft., lower parts with soft reflexed hairs, very pubescent above. *Leaves* very variable, much as in *G. urbanum*, but the segments are often numerous, the lateral larger, and all more toothed; stipules small. *Flowers* 1–1½ in. diam. *Calyx-segments* red-brown, acuminate, pubescent. *Petals* yellow, obcordate. *Fruit* more or less hispid. —DISTRIB. Europe (Arctic), Siberia, W. Asia, E. and W. N. America, Fuegia, Australia, New Zealand.

G. intermédium; Ehr. (hybrid); flowers sometimes erect, petals of the form of *G. urbanum* but deeper-coloured, calyx intermediate between *urbanum* and *rivale* not reflexed in fruit, fruit usually sessile.—Damp woods, not uncommon (often with *rivale*, seldom with *urbanum*, Syme). Bell-Salter produced this hybrid, and it proved fertile.

6. FRAGA'RIA, *L.* STRAWBERRY.

Perennial scapigerous herbs, with creeping stolons. *Leaves* 3-foliolate, very rarely pinnate or simple; stipules adnate to the petiole. *Flowers* white or yellow, often polygamous. Calyx persistent, with 5 bracteoles at its base; lobes 5, valvate in bud. *Petals* 5. *Stamens* many, persistent. *Carpels* many, on a convex receptacle; styles ventral, persistent; ovule 1, ascending. *Achenes* many, minute, sunk in the surface of a large fleshy receptacle.—DISTRIB. Temp. and mountain regions of the N. hemisphere, S. America, Sandwich Islands, Bourbon; species 3 or 4.—ETYM. The old Latin name for the *fragrant* fruit.

1. **F. ves'ca,** *L.*; leaflets usually sessile, pedicels with silky appressed hairs, flowers hermaphrodite. *Wild Strawberry.*

Shady places; ascending to near 2,000 ft. in the Highlands; fl. April–May.—Silky and hairy. *Rootstock* short or long, woody, with a terminal tuft of leaves. *Radical leaves* petioled; leaflets 1–2 in., obliquely ovate or oblong, coarsely toothed or serrate, plaited; lateral sometimes cleft; stipules scarious. *Scapes* 1–6 in., lateral. *Flowers* ½–¾ in. diam., in irregular cymes, inclined, white; bract at the base of the cyme leafy, at the pedicel smaller, stipuliform; bracteoles ovate, smaller than the acute calyx-lobes. *Petals* obovate. *Receptacle of fruit* obovoid or globose, red or white covered to the base with achenes, calyx-lobes spreading.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya, E. and W. N. America.

F. ELA'TIOR, *Ehr.*; much larger than *F. vesca*, leaflets often shortly stalked, pedicels with spreading hairs, flowers sub-1-sexual.

A garden escape; fl. April–May.—The cultivated Haut-bois strawberry, whose origin is probably *F. vesca.*

7. POTENTIL'LA, *L.* CINQUEFOIL.

Perennial herbs, rarely shrubs. *Leaves* compound; stipules adnate to the petiole. *Flowers* white or yellow, rarely red, solitary or in corymbose cymes. *Calyx* persistent, 5- rarely 4-bracteolate; lobes as many, valvate in bud. *Petals* as many, sometimes narrow. *Stamens* many, rarely few and definite. *Disk* annular or coating the calyx-tube. *Carpels* many, rarely 1 or few, on a small dry receptacle; style persistent or deciduous,

ventral or basal; ovule 1, pendulous. *Achenes* many, on a dry receptacle. —DISTRIB. N. temp., Arctic, and mountain regions, 2 are found in the south; species 120.—ETYM. *Potens*, from the *powerful* medicinal effects attributed to some.

SECTION 1. **Trichothal'amus,** *Lehm.* (gen.). Shrubby. *Petals* 5, orbicular, yellow. *Achenes* many, hairy, on a very hispid receptacle.

1. **P. frutico'sa,** *L.*; silky, leaves subdigitately-pinnate.

Rocky banks by rivers, local; Upper Teesdale, Durham, Cumberland, Westmoreland; N. Clare and Galway; fl. June–July.—A much-branched, leafy shrub, 2–4 ft.; bark flaking. *Leaves* oblong or lanceolate; leaflets 3–5, ½–¾ in.; margins entire, revolute; stipules entire. *Flowers* 1–1½ in., few, in terminal subcorymbose cymes, golden yellow, sub-1-sexual; bracts lanceolate, longer than the ovate calyx-segments.—DISTRIB. N. Europe (Arctic), Siberia, W. Asia to the Himalaya, E. and W. N. America.—In Teesdale the flowers appear to be functionally 1-sexual; those of the sexes differ in appearance.

SECTION 2. **Coma'rum,** *L.* (gen.). *Petals* 5, small, oblong-lanceolate, acuminate, purple-brown. *Stamens* many. *Achenes* many, glabrous, on a conical dry spongy downy receptacle.

2. **P. Coma'rum,** *Nestl.*; leaves pinnately 5–7-foliolate. *Comarum palustre*, L.

Bogs and marshes, ascending to nearly 2,800 ft. in the Highlands; fl. June–July.—Sparingly hairy. *Rootstock* long, woody; roots fibrous. *Stems* ½–1½ ft., ascending, purple-brown. *Leaves* 2–4 in.; leaflets 1½–2 in., narrow-oblong, obtuse, coarsely serrate, pale below; stipules large, membranous, free portion often cut. *Flowers* 1–1½ in. diam., few. *Bracts* smaller than the ovate-lanceolate acuminate sepals, purplish; petals much smaller, dark purplish-brown. —DISTRIB. Europe (Arctic), except Turkey, all N. Asia, E. and W. N. America.—Rootstock powerfully astringent, and yields a yellow dye.

SECTION 3. **Sibbald'ia,** *L.* (gen.). *Petals* 5–7, linear-oblong or 0 (yellow in the British species). *Stamens* 4–10. *Achenes* 4–10, glabrous, on a concave pubescent receptacle.

3. **P. procum'bens,** *Clairv.*; leaves 3-foliolate; leaflets obovate truncate and 3–5-toothed at the tip. *Sibbaldia procumbens*, L.

Stony places on the Scotch alps, from Peebles northward, between 1,500 and 4,000 ft.; fl. July.—More or less hairy and glaucous. *Rootstock* woody, depressed, branches leafy at the tip. *Leaves* 1–3 in.; leaflets ½–1 in. *Flowering stems* 3–5 in., lateral, ascending, leafy. *Flowers* ¼ in. diam., few, in terminal close cymes. *Petals* small. *Calyx-segments* lanceolate, acute; bracteoles linear.—DISTRIB. Alpine and Arctic Europe, Asia from the Himalaya northwards, N. America.

SECTION 4. **Potentil'la** proper. Petals 5, rarely 4, orbicular or obcordate, usually yellow or white. *Stamens* many. *Achenes* many, glabrous or nearly so, on a concave glabrous or hairy receptacle.

* *Flowering stems annual, from below the crown of the rootstock.*

4. **P. Tormentil'la,** *Sibthorp*; stem slender rarely rooting, leaves 3-rarely 5-foliolate, flowers usually cymose, petals usually 4 yellow, achenes reticulate. *Tormentilla officinalis*, Curtis.

Heaths, copses, dry pastures; ascending to 3,300 ft. in the Highlands; fl. June–Sept.—Slightly hairy. *Rootstock* stout, almost tuberous. *Stems* 6–10 in., slender, lateral, prostrate then ascending, leafy, clothed with curly hairs. *Leaves* sessile; radical petioled, leaflets ¼–⅓ in., obovate-cuneate, 3–4-toothed or -lobed near the tip; cauline subsessile, leaflets much narrower; stipules foliaceous, cut. *Flowers* ½–¾ in. diam., rarely solitary, yellow. *Calyx-segments* ovate, bracteoles linear, as long.—DISTRIB. Europe (Arctic), W. Siberia, Azores.—Rootstock strongly astringent, used for tanning.

VAR. 1, *erec'ta*, L. (sp.); suberect, cauline leaves sessile 3-foliolate, cyme corymbose. *P. sylvestris*, Necker.—VAR. 2, *procum'bens*, Sibthorp (sp.); procumbent, often rooting, cauline leaves 3–5-foliolate, often petioled, flowers very few or solitary. *P. mixta*, Neck.; *Tormentil'la rep'tans*, L.

5. **P. rep'tans,** *L.*; stem slender creeping and rooting, leaves digitately 5- rarely 3-foliolate long-petioled, flower solitary on slender axillary peduncles, petals 5 yellow, achenes granulate. *P. nemoralis*, Nestl.

Meadows, waysides and pastures; fl. June–Aug.—Very variable in size; usually larger than *P. Tormentilla*, and having besides the above characters bracteoles as broad as the sepals, and flowers ¾–1 in. diam.—DISTRIB. Europe, N. and W. Asia to the Himalaya, W. Europe from Gothland southwards to Italy (excl. Spain), Canaries and Azores.

6. **P. ver'na,** *L.*; stem prostrate, leaves digitately 5–7-foliolate, leaflets obovate or cuneate truncate deeply crenate or lobulate towards the tip, flowers several yellow, achenes smooth glabrous.

Hilly pastures and rocky places, local; from Forfar to Cambridge and Somerset; absent in Ireland; fl. April–June.—More or less hairy. *Rootstock* woody, branched, tufted. *Radical leaves* 2–3 in.; stipules with narrow subulate tips; leaflets ¼–¾ in., green on both surfaces; terminal tooth short; cauline 1–3-foliolate, their stipules ovate-lanceolate. *Flowers* few, ½ in. diam.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya.

7. **P. salisburgen'sis,** *Haenke;* stem ascending, leaves digitately 5–7-foliolate, leaflets obovate or cuneate deeply crenate or serrate usually above the middle, flowers several yellow, achenes smooth glabrous. *P. alpestris*, Hall. f.; *P. aurea*, Sm. not L.

Rocky ledges in alpine districts, Breadalbane, Braemar, Yorkshire, Westmoreland, and Cardigan; ascends to 2,700 ft. in the Highlands; fl. June–July. —Probably a larger form of *P. verna*, with ascending stems, 4–10 in., larger less truncate leaflets (but not constantly so), and flowers 1 in. diam.—DISTRIB. Europe (Arctic), N. and W. Asia, Greenland, Labrador.—Lehmann, Babington, and others adopt Pourret's name of *P. maculata* for this; it is coeval with that of *salisburgensis*, and I have taken the latter because the spotted-petalled form (which occurs on Ben Lawers) is a scarce one.

8. **P. anseri'na,** *L.*; stoloniferous, silky, leaves interruptedly pinnate, leaflets many deeply serrate or pinnatifid, the alternate minute, flowers solitary yellow, achenes glabrous smooth. *Silver Weed.*

Roadsides and damp pastures; ascends to 1,000 ft. in Yorkshire; fl. July–Aug. —Softly silky, especially on the leaves (hence silvery) beneath. *Rootstock* slender, branched. *Stems* 0. *Leaves* 2–5 in., stoloniferous from their axils; leaflets ½–2 in., alternate, close-set, sessile, obovate-oblong, obtuse, serratures tipped with silky hairs. *Flowers* ½–¾ in. diam. on solitary axillary slender

peduncles; bracteoles often serrate.—DISTRIB. Temp. and Arctic regions of the N. and S. hemispheres.—Rootstock eaten in times of scarcity in the Hebrides.

9. **P. Fragarias'trum,** *Ehr.*; leaves 3-foliolate, leaflets obovate, flowers white, achenes pilose below reticulate. *Fragaria sterilis,* L.

Waysides, woods and banks; ascending to 2,100 ft. in Wales; fl. March–May. —Similar to *Fragaria vesca,* but has no runners, nerves of leaflets not sunk above, and fruit very different. More or less pilose or silky. *Rootstock* stout, woody, branched, depressed. *Leaves* 2–6 in., tufted; petioles with spreading hairs; leaflets ½–1 in. coarsely crenate towards the tip; very hairy beneath. *Flowering stems* or scapes 1–6 in., axillary, slender, naked or 1–2-leaved, 1–3-flowered. *Flowers* ½ in. diam. *Receptacle* with very long hairs (as in *P. fruticosa*).—DISTRIB. Europe, N. Africa.

** *Flowering stems annual, from the top of the branches of the rootstock. Receptacle hairy.*

10. **P. rupes'tris,** *L.*; leaves pinnate, radical 5- cauline 3-foliolate, flowers white.

Limestone rocks, Craig Breidden, Montgomery; fl. May–June. — Hairy, especially below. *Rootstock* woody, branched. *Stems* 1–2 ft., erect, branched above. *Radical leaves* 3–6 in., petioles very slender; leaflets ¼–1 in., unequal at the base, oblong or obliquely obovate, irregularly crenate, cauline few, subsessile. *Flowers* few, ½–1 in. diam. *Achenes* smooth, glabrous.—DISTRIB. Europe, from Gothland southwards (excl. Greece), Siberia, Dahuria, N.W. India.

11. **P. argen'tea,** *L.*; leaves digitately 5-foliolate, leaflets cuneate much cut white beneath, flowers yellow.

Dry pastures and roadsides; England and E. Scotland, from Moray southwards, local; absent from Ireland; fl. June–July.—More or less covered, especially the leaves beneath, with white appressed wool. *Rootstock* short, woody. *Stems* 6–18 in., slender, suberect or decumbent, branched, leafy; branches divaricating. *Leaves* petioled, uppermost sessile; leaflets ½–1½ in., narrowly cuneate, ½-pinnatifid upwards, margins recurved. *Flowers* ⅓–½ in. diam., subcorymbose. *Achenes* smooth, glabrous.—DISTRIB. Europe (Arctic), Siberia, E. N. America.

8. ALCHEMIL'LA, *L.* LADY'S MANTLE.

Annual or perennial herbs. *Leaves* orbicular, lobed or deeply divided; stipules adnate to the petiole. *Flowers* minute, in lax or crowded corymbose cymes. *Calyx* urceolate, persistent, 4–5-bracteolate; lobes 4–5, valvate in bud. *Petals* 0. *Stamens* 1–4, inserted on the mouth of the calyx. *Disk* coating the calyx-tube, and all but closing its mouth by its thickened margin. *Carpels* 1–5, basal in the calyx-tube; styles basal or ventral; ovule 1, basal. *Achenes* 1–4, enclosed in the membranous calyx-tube.—DISTRIB. Natives chiefly of the American Andes; a few are European, N. Indian, and American; species 30.—ETYM. Arabic.

SECTION 1. **Aph'anes,** *L.* (gen.). Annual. *Cymes* leaf-opposed, dense. *Bracteoles* minute or 0. *Antherifcrous stamens* 1–2.

1. **A. arven'sis,** *Lamk.*; leaves cuneate or fan-shaped 3-lobed, lobes cut. *Aphanes,* L.

Fields and waste places in dry soil; ascending to 1,600 ft. in the Highlands; fl. May–Aug.—Hairy, much branched from the base; branches 2–8 in., erect or prostrate. *Leaves* ¼–½ in., narrowed into the short petiole, lobes cuneate; stipules palmately cut. *Flower* minute, hidden by the stipuliform bracts. *Calyx* usually 4-cleft. *Achenes* 1–3.—DISTRIB. Europe, N. Africa; introd. in N. America.

SECTION 2. **Alchemil'la** proper. Perennial. *Cymes* corymbose or panicled. *Bracteoles* conspicuous. *Antheriferous stamens* usually 4.

2. **A. vulga'ris,** *L.*; leaves reniform plaited 6–9-lobed green beneath.

Moist pastures and streams, except in the S.E. of England; ascending to 3,600 ft. in the Highlands; fl. June–Aug.—More or less hairy. *Rootstock* black, stout, short. *Stem* 6–18 in., ascending. *Radical leaves* 2–6 in. diam., lobes serrate, petioles 6–18 in., cauline smaller; stipules connate and sheathing, toothed. *Cymes* irregularly racemed or panicled. *Flowers* ⅛ in. diam., yellow-green; pedicels short. *Achenes* 1 or 2, glandular.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya, Greenland, Labrador.—Rootstock astringent and edible.

VAR. *monta'na,* Willd. (sp.); leaves and petioles very pubescent or silky. *A. hybrida,* Pers.

3. **A. alpi'na,** *L.*; leaves 5–7-partite or -foliolate silvery beneath.

Rocks and streams, Mts. of Scotland, and N. of England; between 400 and 4,000 ft., absent in Wales; Brandon Mt. and Benbulben, Ireland; fl. June–Aug.—More or less clothed with silky hairs, except the upper surface of the leaves. *Rootstock* slender, branched. *Stems* 3–9 in., ascending, slender. *Leaves* on slender petioles, upper 1–2 in. diam., sessile, orbicular-reniform; leaflets ¾–1¼ in., narrow oblong, sharply toothed at the tip; stipules connate and sheathing, cleft. *Cymes* interruptedly spiked and panicled. *Flowers* ⅛ in. diam., yellow-green; pedicels short, pilose. *Achenes* minutely glandular.—DISTRIB. Europe (Arctic), Siberia, W. Asia, Greenland.

VAR. *conjuncta,* Bab. (sp.); leaflets connate for ⅓ their length. *A. argentea,* Don.—Faroe Isles.

9. AGRIMO'NIA, *L.* AGRIMONY.

Slender perennial herbs. *Leaves* pinnate; leaflets serrate; stipules partially adnate to the petiole. *Flowers* small, yellow, in terminal spike-like racemes; pedicels bracteate at the base, 2-bracteolate. *Calyx* persistent; tube turbinate, spinous; mouth contracted; lobes 5, imbricate. *Petals* 5. *Stamens* 5–10 or more, inserted at the mouth of the calyx. *Disk* lining the calyx-tube, its margin thickened. *Carpels* 2, included in the calyx-tube; styles exserted, stigma 2-lobed; ovule pendulous. *Fruit* pendulous, of 1 or 2 achenes enclosed in the hardened spinous calyx.—DISTRIB. N. temp. regions, and S. America; species 8.—ETYM. obscure.

1. **A. Eupato'ria,** *L.*; leaves interruptedly pinnate, spines of calyx hooked.

Hedgebanks, copses, and borders of fields; ascending to 1,200 feet in Yorkshire; fl. June–Aug.—Hairy or villous, erect, leafy, 1½–3 *ft.*, rarely branched. *Rootstock* woody, short. *Leaves* 3–7 in.; leaflets 3–10 pairs, larger upwards, largest 1–3 in., sessile, oblong or lanceolate, deeply coarsely serrate; smaller ¼–½ in., obovate or cuneate, 3–5-lobed; stipules foliaceous,

½-lunate. *Racemes* lengthening and pedicels recurved in fruit; bracts 3-fid; bracteoles close to the calyx. *Flowers* ⅓ in. diam. *Calyx-tube* ⅛ in., woody in fruit, spines many around the thickened mouth; segments conniving, triangular, acute.—DISTRIB. N. temp. regions, N. and S. Africa.—Rootstock astringent, and yields a yellow dye.

Sub-sp. EUPATO'RIA proper; calyx-tube obconic deeply furrowed, lower spines spreading.

Sub-sp. ODORA'TA, *Mill.* (sp.); more branched, resinous-scented, racemes denser, flowers larger, calyx-tube campanulate scarcely furrowed, lower spines spreading or reflexed.—From Westmoreland southwards to Jersey, local; very rare in Ireland.

10. POTE'RIUM, *L.*

Erect perennial herbs. *Leaves* pinnate; leaflets stalked; stipules adnate to the sheathing petiole. *Flowers* small, subsessile, in dense long-peduncled heads or centrifugal spikes, bracteate, 2-bracteolate, often polygamous. *Calyx-tube* persistent, turbinate, mouth contracted; lobes 4, petaloid, deciduous, imbricate in bud. *Petals* 0. *Stamens* 4 or more, inserted at the mouth of the calyx, filaments slender pendulous. *Disk* lining the calyx-tube and closing its mouth. *Carpels* 1–3, enclosed in the calyx-tube; styles filiform, stigma penicillate; ovule 1, pendulous. *Achenes* solitary, enclosed in the hardened 4-angled often winged or muricate calyx-tube.—DISTRIB. N. temp. regions; species 20.—ETYM. obscure.

1. **P. Sanguisor'ba,** *L.*; upper flowers of each head female, lower male or 2-sexual, stamens 20–30 much exserted, fruiting calyx 4-winged reticulate but not pitted between the wings, edges of reticulation smooth. *Salad Burnet.*

Dry pastures, from Perth and Forfar southwards; ascending to 1,600 ft. in Yorkshire; rarer in Scotland and in Ireland; fl. June–Aug.—Erect or decumbent, 6–18 in., glabrous or nearly so, slender, much branched. *Root-stock* stout. *Radical leaves* 4–10 in.; leaflets 5–10 pair, ½–¾ in., petioled, broadly oblong, coarsely serrate; stipules leafy. *Flower-heads* ½–¾ in., on long peduncles, shortly oblong, purplish. *Calyx-lobes* ⅛ in., oblong; wings thin; bracteoles ciliate. *Stigmas* exserted. *Achene* dark, striate.—DISTRIB. Europe, N. Africa, Siberia.

P. MURICA'TUM, *Spach;* flower-heads and flowers as in *P. Sanguisorba,* but fruiting calyx with thick entire or toothed wings, pitted and reticulated between the wings, ridges muricate and toothed.

Cultivated ground in Mid. and S. England; an alien or colonist, *Watson;* fl. July.—Chiefly distinguished from *P. Sanguisorba* by the larger fruit and calyx.—DISTRIB. Mid. and S. Europe.

2. **P. officina'le,** *Hook. f.*; flowers 2-sexual, stamens 4 not longer than the calyx-lobes, fruiting calyx 4-winged smooth between the wings. *Sanguisorba officinalis,* L. *Great Burnet.*

Damp meadows, from Roxburgh and Kirkcudbright southwards; ascending to 1,500 ft. in Yorkshire; W. and N. of Ireland; fl. June–Aug.—Very similar to *P. Sanguisorba,* but leaflets fewer, longer, less deeply serrate, usually cordate at the base, and flower-heads often cylindric and ½ in. long.—DISTRIB. Europe (Arctic), excl. Spain, Siberia, Dahuria, W. Asia.

11. RO'SA, *L.* ROSE.

Erect, sarmentose or climbing shrubs, usually prickly. *Leaves* pinnate; leaflets serrate; stipules adnate to the petiole. *Flowers* terminal, solitary or corymbose, white yellow or red, rarely bracteate. *Calyx-tube* persistent, globose ovoid or pitcher-shaped; mouth contracted; lobes leafy, imbricate in bud. *Petals* 5. *Stamens* many, inserted on the disk. *Disk* coating the calyx-tube, all but closing its mouth by its thickened margin, silky. *Carpels* many, rarely few, in the bottom of the calyx-tube; styles subterminal, free or connate above, stigma thickened; ovule 1, pendulous. *Achenes* coriaceous or bony, enclosed in the fleshy calyx-tube.—DISTRIB. N. temp. regions, rare in America; extending into Abyssinia, India, and Mexico; species about 30.—ETYM. The old Latin name.

The following account of the British roses is condensed from Mr. Baker's valuable monograph (*Linn. Journ.* xi. 197), and has been kindly revised by himself;—with this difference, Baker's species are here reduced to subspecies. As with the *fruticose Rubi* group, so with this genus, all the so-called species are connected by intermediates; but whereas, in the fruticose *Rubi*, the 4 or 5 most distinct British forms are connected by so many links that various excellent botanists regard them as forms of one species; in *Rosa*, on the contrary, the five most distinct British forms are connected by so few (comparatively) intermediates, that no good botanists have reduced them to one species.

1. **R. spinosis'sima,** *L.*; small, erect, bushy, prickles crowded very unequal nearly straight passing into stiff bristles and glandular hairs, leaves not or slightly glandular, sepals more or less persistent, fruit short, disk small or 0. *Scotch Rose.*

Open places; fl. May–June.—*Shrub* 1–4 ft., much branched. *Leaves* small; leaflets 7–9, singly or doubly serrate, usually broad. *Flowers* 1–1½ in. diam., often only 1–2, rarely 3 or more, white or pink; calyx-tube usually glabrous. *Styles* free.

Sub-sp. PIMPINELLIFO'LIA, *L.* (sp.); leaflets 7–9 glabrous simply serrate, flowers always solitary, sepals glabrous simple, fruit subglobose dark purple, disk 0. —Dry places, especially sandy sea-shores; ascends to 1,700 ft. in Scotland: *Burnet Rose.*—DISTRIB. Europe (Arctic), N. Africa, Siberia to N. China, W. Asia to the Himalaya.

Sub-sp. INVOLU'TA, *Smith* (sp.); leaflets glabrous or pubescent beneath usually doubly-serrate, flowers 1–3, sepals densely glandular on the back more or less pinnate, fruit erect subglobose red. — Banks and hedges. — DISTRIB. Belgium, Switzerland (near Geneva only).—VAR. 1, *Sabi'ni*, Woods (sp.); prickles ⅓ in. straight, leaflets with copious compound serratures thinly pubescent above, petiolos and peduncles densely hairy glandular and bristly, calyx-tube subglobose more or less setose, sepals pinnate, fruit subglobose. *R. gracilis*, Woods; *R. nivalis*, Don; *R. coronata*, Crep. The most common form.—VAR. 2, *Don'iana*, Woods (sp.); small, leaflets more densely hairy, flowers solitary, sepals hardly pinnate, calyx-tube and fruit densely prickly. Dry places. Approaches *R. mollissima.*—VAR. 3, *gracilescens*, Baker; robust, leaflets thinly hairy on both surfaces, eglandular beneath, much toothed, terminal 1–1½ in., flowers 3–6, calyx-tube glabrous ellipsoid. Antrim.—VAR. 4, *Robertso'ni*, Baker; sepals of *Sabini*, but teeth of leaflets sharper and less compound, upper surface glabrous when mature,

calyx-tube sometimes naked. Newcastle, Yorkshire, Antrim. — Var. 5, *Smith'ii*, Baker; stunted, mature leaflets glabrous above hairy and eglandular below, serratures sharp and close, flowers solitary, calyx-tube densely aciculate, sepals simple. *R. involu'ta*, Sm. Arran, Yorkshire. — Var. 6, *lævigа'ta*, Baker; leaflets of *Sabini*, petioles villous and glandular rarely bristly, peduncle and calyx-tube glabrous, sepals simple eglandular, fruit depressed globose. Yorkshire, Antrim and Derry.—Var. 7, *Moor'ei*, Baker; prickles very stout ½ in., leaflets densely glandular beneath, petiole peduncle and calyx-tube densely setose and glandular the larger prickles curved, sepals slightly pinnate. Derry. Approaches *R. rubiginosa*.—Var. 8, *occidenta'lis*, Baker; near *Wilsoni*, but leaflets smaller and petioles and peduncles glandular and bristly, calyx-tube globose. Ireland, locality unknown.—Var. 9, *Wilso'ni*, Borrer (sp.); tinged with purple, prickles as in *Sabini*, leaflets often cordate terminal large glabrous above, ribs thinly hairy and subeglandular beneath, serratures simple, calyx-tube almost glabrous, sepals nearly simple, fruit subovoid. Menai Straits; Derry. Approaches *R. rubella*.

Sub-sp. HIBER'NICA, *Smith* (sp.); prickles stout curved, leaflets glabrous above glaucous slightly pubescent beneath eglandular simply serrate, petiole pubescent, flowers 1–3 (rarely 4–12), sepals pinnate glabrous, fruit erect subglobose naked, disk moderate. *R. pubescens*, Baker.—N. of England, Scotland and Ireland, ascending to 1,000 ft. Unknown on the Continent. —Var. 1, *gla'bra*, Baker; leaflets glabrous, serratures sharper, peduncle naked. Resembles *R. canina*.—Var. 2, *cordifo'lia*, Baker; prickles more slender and denser, leaflets almost glabrous below, terminal 1½ in., serratures more open and obtuse, peduncle bristly and glandular. Northumberland.

2. **R. villo'sa,** *L.*; bush large, erect, or branches elongate and arching, prickles uniform scattered slender nearly straight, leaflets very hairy eglandular or nearly so beneath, sepals more or less persistent densely glandular, fruit globose or turbinate densely prickly rarely naked.

Hedges and thickets, especially in the N. of England and Ireland, ascends to 1,500 ft. in Yorkshire; fl. June–July.—Chiefly distinguished from *R. spinosissima* by its larger size, equal prickles, fewer very downy leaflets, which are more constantly doubly serrate, and the more glandular fruit; and from *R. canina* by the straight prickles, and globose glandular fruit.—Distrib. Europe (Arctic), W. Asia.

Sub-sp. POMIF'ERA, *Herm.* (sp.); branches arching, sepals copiously pinnate quite persistent, corolla often ciliate and glandular, fruit ripening early, disk 0. — Stafford and Gloucestershire; not indigenous, common in gardens.

Sub-sp. MOLLIS'SIMA, *Willd.* (sp.); branches erect, leaflets softly pubescent, sepals sparingly pinnate quite persistent, fruit ripening early, disk 0. *R. mollis*, Sm.; *heterophylla*, Woods.—From Derby northwards, N. Wales, Derry, Antrim.—Var. 1, *cæru'lea*, Baker; glands and bristles few on the petiole, ovary glandular, fruit broad glabrous, peduncle naked or with few bristles.—Var. 2, *pseu'do-rubigino'sa*, Lejeune (sp.); leaflets nearly glabrous above glandular below, petiole and calyx-tube densely bristly.

Sub-sp. TOMENTO'SA, *Sm.* (sp.); branches long (6–10 ft.) arching, prickles sometimes curved, leaflets pubescent, sepals copiously pinnate not quite persistent, fruit not ripening early, disk distinct.—Common; extends into Arctic Europe.—Var. 1, *subglobo'sa*, Sm. (sp.); (*R. Sherardi*, Davies),

VAR. 2, *farino'sa*, Raw. (sp.),—VAR. 3, *scabrius'cula*, Sm. (sp.),—VAR. 4, *sylves'tris*, Woods (*R. Jundzilliana*, Baker; *R. britannica*, Des.),—VAR. 5, *obova'ta*, Baker;—are forms differing in pubescence and amount of glands on the leaves petioles peduncles calyx-tube and sepals, amount of double serration of the leaflets, number of flowers in a cluster, and of prickles, their length strength and curvature.

3. **R. rubigino'sa,** *L.*; bush small, branches erect or arching, prickles stout at the base scattered hooked with often glandular hairs and bristles intermixed, leaflets densely glandular aromatic glabrous or thinly hairy, flowers 1–3, sepals subpersistent, fruit globose ovoid or oblong.

Best distinguished by its suberect habit and copious glandular pubescence, which gives out the strong sweetbriar odour; this, however, becomes fainter in the forms that pass into *R. canina* and *R. villosa*.—Europe, Siberia, W. Asia to N.W. India; introd. in N. America.

Sub-sp. RUBIGINO'SA proper; very sweet-scented, erect, branches compact, prickles with a few bristles and glandular hairs intermixed, peduncles densely bristly, leaflets at length glabrous above pubescent beneath, sepals densely glandular pinnate, fruit globose. *R. Eglanteria*, Woods.—Chalk hills, S. of England, native; probably an escape in the N. of England, Scotland, and Ireland. *Sweetbriar.*—VAR. 1, *permix'ta*, Deseg. (sp.); leaves and styles glabrous, sepals deciduous, fruit ovoid. Box-hill. Approaches *micrantha*.—VAR. 2, *sylvic'ola*, Deseg. and Ripart (sp.); less scented, prickles more slender, leaflets hairy and less glandular beneath, styles hairy, fruit ovoid. N. Yorkshire.

Sub-sp. MICRAN'THA, *Smith* (sp.); branches long arched, prickles equal, odour faint, leaflets small more pointed glabrous above, densely glandular below, flower 1 in. diam., sepals deciduous densely glandular with a leafy point and 1–2 leaflets, styles glabrous, fruit urceolate scarlet, disk evident.—Midway between *rubiginosa* and *canina*.—Throughout England; Ireland, Cork only.—VAR. 1, *Briggs'ii*, Baker; large and luxuriant, leaflets larger less glandular beneath, peduncles and fruit naked, sepals more pinnate eglandular on the back. Plymouth.—VAR. 2, *hys'trix*, Leman (sp.); small, leaflets narrow glabrous, calyx-tube glabrous, peduncle densely aciculate. Box-hill, Oxfordshire, Bristol.

Sub-sp. SE'PIUM, *Thuill.* (sp.); laxer in habit than *rubiginosa*, prickles with a few bristles and glandular hairs intermixed, leaflets small narrowed to both ends glabrous but densely glandular beneath, peduncle and ovoid fruit naked, sepals subpersistent, disk moderate, styles pubescent.—Surrey.—VAR. 1, *Billiet'ii*, Puget (sp.); differs only by its leaves rather hairy below and rounded at the base. *R. sepium*, Borrer, E.B.S. Warwickshire.—VAR. 2, *pulverulen'ta*, M. Bieb. (sp.); much taller, flowers 1½ in. diam., leaflets larger rounded at the base, sepals more copiously pinnate, fruit ovoid. *R. inodora*, Fries. England, local.—VAR. 3, *cryptopo'da*, Baker; differs from the last principally by its very short peduncles and round fruit. West Yorkshire.

4. **R. cani'na,** *L.*; bush large, branches long arching, prickles scattered uniform stout broad hooked thickened at the base, leaflets eglandular (except rarely on the midrib and veins beneath) glabrous or thinly hairy acute very sharply toothed, peduncle usually naked, flowers 1 or more, sepals usually naked reflexed pinnate, styles free or nearly so hirsute, fruit ovoid urceolate or subglobose, disk conspicuous. *Dog Rose.*

Thickets, hedges, &c. ascending to 1,350 ft. in Yorkshire; fl. June–Aug.—Of the above characters, most disappear in one or other of the following 29 varieties, which Mr. Baker has systematized with great skill. In its common form, this is the largest and freest growing of British roses, and may be distinguished from *spinosissima* by the hooked prickles and habit, from *villosa* by being more glabrous, from *rubiginosa* by being eglandular, and from *arvensis* by the free styles.—DISTRIB. Europe, N. Africa, Siberia.

SERIES 1. **Ecristat'æ.** *Leaves* eglandular beneath. *Sepals* reflexed after the fall of the petals, deciduous before the fruit (which ripens late) changes colour.

* *Leaves glabrous on both surfaces. Peduncles not bristly.*

VAR. 1, *lutetia'na*, Leman (sp.); 10–12 ft., leaflets about 7 green or glaucous, terminal obovate, serratures simple, flowers 1–4 pink 2 in. diam., sepals naked. Abundant.—VAR. 2, *surculo'sa*, Woods (sp.); robust, flowers 10–30, leaflets flat rounded at the base, teeth open.—VAR. 3, *sphæ'rica*, Gren. (sp.); like *lutetiana*, but leaflets broader, petioles pubescent, fruit globose ¾ in. diam., styles villous.—VAR. 4, *sentico'sa*, Ach. (sp.); slender, flexuous, leaflets 1 in., teeth acute, fruit small globose.—VAR. 5, *duma'lis*, Bechst. (sp.); petiole glandular, stipules and sepals more densely gland-ciliated, leaflets doubly-serrate. *R. sarmenta'cea*, Sm.; *glaucophylla*, Winch. Very common.—VAR. 6, *biser'rata*, Merat (sp.); quite like VAR. 5, but serratures more open and very compound, petioles very glandular.—*R. vina'cea*, Baker, has leaflets and bracts narrow acute, and fruit oblong.

** *Leaves glabrous above, hairy on the nerves beneath. Peduncles not bristly.*

VAR. 7, *ur'bica*, Leman (sp.); like *lutetiana*, but leaves pilose below and petioles pubescent scarcely glandular. *R. collina*, Woods; *Forsteri*, Smith; *platyphylla*, Rau.—VAR. 8, *frondo'sa*, Steven (sp.); leaflets smaller, flatter ovate-oblong more rounded at the base, fruit smaller globose. *R. dumeto'rum*, Woods.—VAR. 9, *arvat'ica*, Baker; like *urbica*, but leaves doubly-serrate, fruit ovoid. Common in the N. of England.

*** *Leaflets more or less hairy on both surfaces. Peduncles not bristly.*

VAR. 10, *dumeto'rum*, Thuill. (sp.); leaflets green terminal often large thinly hairy above softly below simply-serrate, fruit large ovoid, styles villous. *R. uncinel'la*, Besser.—VAR. 11, *pruino'sa*, Baker; leaflets glaucous doubly-serrate, petioles glandular. *R. cæsia*, Borrer.—VAR. 12, *inca'na*, Woods (sp.); leaflets very glaucous above densely pubescent beneath with few inconspicuous glands doubly-serrate, fruit large oblong. *R. canescens*, Baker.—VAR. 13, *tomentel'la*, Leman (sp.); flexuous, leaflets short green above very hairy below doubly serrate, petioles prickly, peduncles very short, flowers small white, fruit small short. *R. inodora*, Hook. *Fl. Lond.*

**** *Peduncles more or less bristly and glandular.*

VAR. 14, *Andevagen'sis*, Bast. (sp.), is *lutetiana* with bristly peduncles. S. of England, rarer in the N. and Scotland.—VAR. 15, *verticillacan'tha*, Merat, is *dumalis* with ditto. Not uncommon.—VAR. 16, *colli'na*, Jacq. (sp.), is *urbica* with ditto. Surrey and Devonshire.—VAR. 17, *ca'sia*, Smith (sp.); near *collina*, but leaflets grey-green, stipules and bracts pubescent on the back. Argyle, Northumberland, Leicester.—VAR. 18, *concin'na* Baker; prickles much hooked, leaflets very small simply-serrate, petioles not setose pubescent, ovary small, styles short thinly hairy. Devonshire.—VAR. 19, *decip'iens*, Dumort.; like *tomentella*, but for the bristly peduncles, more glandular

midrib, pubescent and glandular petiole, and sepals densely glandular not fully reflexed. Northumberland, Chester, Leicester.

SERIES 2. **Subcrista'tæ.** *Leaves* eglandular beneath. *Sepals* ascending after the fall of the petals, not deciduous till after the fruit (which ripens early) changes colour.

VAR. 20, *Reu'teri,* Godet (sp.); near *lutetiana,* but prickles more slender, peduncles short almost concealed by the bracts, leaflets glaucous, bracts stipules and branches turning red. *R. nuda,* Woods; *Crepiniana,* Deseg. N. England, common.—VAR. 21, *subcrista'ta,* Baker; like *dumalis,* except for characters of *Subcristatæ.* N. of England and Scotland.—VAR. 22, *Hartstoné'i,* Baker; leaves as in *subcristata,* fruit later, styles less villous, sepals sooner deciduous, prickles passing into unequal bristles. Yorkshire.—VAR. 23, *implex'a,* Gren. (sp.); like *urbica,* but fruit of this series. Richmond, Yorkshire.—VAR. 24, *coriifo'lia,* Fries (sp.); like *dumetorum,* but fruit of this series, peduncles very short and bracts large. *R. bractescens,* Woods. From Yorkshire northward.—VAR. 25, *Watso'ni,* Baker; differs from *coriifolia* in the doubly-serrate leaves, smaller densely gland-ciliated bracts and glabrous back of stipules, petioles pubescent and glandular. N. of England and Scotland.—VAR. 26, *celera'ta,* Baker; habit and foliage of *tomentella,* but fruit of this series. Holy-well Dene, Northumberland.

SERIES 3. **Subrubigino'sæ.** *Leaflets* glandular beneath on the midrib and principal nerves only (not on the surface, as in *R. rubiginosa*).

VAR. 27, *Bor'reri,* Woods (sp.); prickles stout much hooked, leaflets flat doubly serrate glabrous above, glands obscure, stipules and bracts densely gland-ciliate, backs of these and sepals naked, flowers many, peduncles bristly, calyx-tube ovoid naked, sepals at length spreading or reflexed deciduous on the fruit changing colour. *R. dumetorum,* Engl. Bot. Yorkshire to Sussex.—VAR. 28, *Bake'ri,* Deseg. (sp.); prickles less hooked, leaflets obovate double-serrate, flowers 3–4, peduncles very short, back of sepals bracts and stipules thinly glandular, sepals at length ascending not deciduous till the naked oblong fruit has changed colour. N. Yorkshire.—VAR. 29, *margina'ta,* Wallroth (sp.); branches purple, prickles more slender less hooked, leaflets altogether glabrous glaucous above pale beneath, veins prominent glandular, flowers 3–4, sepals and fruit much as in *R. Bakeri. R. Blondæana,* Ripart. Arran on the Clyde, N. Yorkshire, N. Wales, Derry.

5. **R. arven'sis,** *L.*; bush large, branches long arching or trailing, prickles uniform stout strongly hooked, leaflets eglandular glabrous or slightly pubescent, flowers 1–6, sepals deciduous, styles glabrous connate into an exserted column, fruit ripening late, disk much thickened.

Hedges and thickets, rare in mountain districts; from Lanark and Haddington southwards, and in Ireland; fl. June–July.—A low trailing plant in its usual form, with the foliage and hooked prickles of *R. canina. Leaflets* glabrous and shining above, rarely downy. *Flowers* rarely solitary, generally white, scentless. *Fruit* naked; achenes sessile or stalked.—DISTRIB. W. and Mid. Europe, from Belgium southwards.

Sub-sp. ARVEN'SIS proper; bush 2–3 ft., branches trailing purple glaucous, prickles often very large, leaflets quite glabrous glaucous beneath, flowers white throat yellow, calyx purple, sepals naked on the back short broad reflexed after flowering deciduous not much pinnate, fruit subglobose small, styles glabrous as long as the stamens. *R. repens,* Scopoli.—Common in S.

of England, rare to the N. and in Scotland.—VAR. 1, *bibractea'ta*, Bast. (sp.); shoots stronger, more arching, leaflets large more acute, fruit obovoid, peduncles thinly glandular. (Easily mistaken for sub-sp. *stylosa* var.)

Sub-sp. STYLO'SA, *Bast.* (sp.); bush tall, rarely low, leaflets pubescent beneath, peduncles elongate more or less bristly and glandular, sepals reflexed much pinnate, styles as long as or shorter than the stamens.—Connects *arvensis* with *canina*.—VAR. 1, *stylo'sa* proper; leaflets oblong acute rounded at the base hairy all over beneath, petioles and peduncles with few glands and bristles, flowers 3–6 white, styles protruded, disk very prominent. Sussex.—VAR. 2, *systy'la*, Bast., differs from VAR. 1 only in the usually pink flowers, leaflets hairy only on the nerves beneath, and petioles less hairy. *R. collina* (*Engl. Bot.*, not of Jacquin). Mid. and S. England.—VAR. 3, *opa'ca*, Baker; leaflets still more hairy beneath rounded at the base, peduncle shorter naked, flower white 1 in. diam., styles scarcely protruded. Kent.—VAR. 4, *gallicoi'des*, Baker; habit and leaflets of *systyla*, but prickles of stem mixed with copious glands and bristles, leaflets almost doubly-serrate, flowers white, fruit narrow, styles as long as stamens. Warwickshire.—VAR. 5, *Monsoʻniæ*, Lindl.; bush low erect, flowers red very large, styles scarcely protruded, fruit subglobose orange-red. Herefordshire.—VAR. 6, *fastigia'ta*, Bast. (sp.); column of styles not protruded.

12. PY'RUS, *L.* PEAR, APPLE, SERVICE, &c.

Trees or shrubs. *Leaves* deciduous, simple or pinnate; stipules deciduous. *Flowers* white or pink, in terminal cymes or corymbs; bracts sub-ulate. *Calyx-tube* urceolate, lobes 5, reflexed, persistent or deciduous. *Petals* 5. *Stamens* many, filaments sometimes connate at the base. *Disk* annular, or coating the calyx-tube. *Carpels* 2–5, connate and adnate to the calyx-tube; styles free or connate below, stigmas truncate; ovules 2 in each cell, ascending. *Fruit* (a pome) fleshy, 2-5-celled; cells with a cartilaginous or bony often 2-valved endocarp, 1–2-seeded.—DISTRIB. N. temp. and cold regions; species 40.—ETYM. The old Latin name.

SECTION 1. **Py'rus** proper. *Fruit* large, 5-celled; cells 1–2-seeded; endocarp cartilaginous. *Cymes* simple. *Styles* 5.

1. **P. commu'nis,** *L.*; cymes corymbose, styles distinct to the base, fruit pyriform. *Wild Pear.*

Woods and thickets, from Yorkshire southwards, often a garden escape; a denizen? *Watson;* fl. April–May.—A shrub or small tree, 20–40 ft.; branchlets more or less spinescent and pendulous. *Leaves* 1–1½ in., fascicled on the last year's wood, alternate on the shoots, oblong-ovate, acute, obtusely serrate, more or less pubescent or flocculent below when young, those of the young tree often lobed; petiole slender. *Flowers* 1–1½ in. diam., white. *Fruit* 1–2 in. long.—DISTRIB. Europe.

VAR. 1, *Pyras'ter*, L.; leaves shortly acuminate pubescent below when young, base of fruit obconic.—VAR. 2, *Achʻras*, Gærtn. (sp.); leaves broader acute or cuspidate flocculent on both surfaces when young, fruit rounded at the base. Rarer.

2. **P. Ma'lus,** *L.*; peduncles umbellate, styles united below, fruit subglobose indented at the base. *Wild or Crab-apple.*

Copses and hedges, from the Forth and Clyde southwards; an escape in Scotland; wild in Ireland; fl. May.—A shrub or small tree; branches spreading. *Leaves* 1–2 in., oblong, rounded acuminate or cuspidate at the tip, glabrous, or downy below when young. *Flowers* few, 1–1½ in. diam., pink and white. *Calyx-segments* woolly. *Fruit* 1 in. diam., yellow.—DISTRIB. Europe.

VAR. 1, *acer'ba*, DC. (sp.); young leaves and tube of calyx glabrous, pedicels slender glabrous or nearly so, fruit drooping.—VAR. 2, *mi'tis;* young leaves tube of calyx and stout pedicels pubescent, fruit erect.

SECTION 2. **Sor'bus,** *L.* (gen.). *Fruit* small, 2–8-celled; cells 1-seeded; endocarp brittle. *Flowers* in compound corymbose cymes.

3. **P. tormina'lis,** *Ehr.;* leaves 6–10-lobed serrate glabrous when mature on both surfaces. *Wild Service.*

Woods and hedges, rare and local from Anglesea and Nottingham southwards; fl. April–May.—A small tree, branchlets and young leaves below pubescent. *Leaves* 2–4 in., oblong-ovate or cordate; lobes triangular, serrate, acuminate. *Flowers* ½ in. diam., many, white. *Carpels* usually 2. *Fruit* ½ in., pyriform or subglobose, greenish-brown, dotted, 2-celled.—DISTRIB. Europe, N. Africa. — Fruit sold in country markets. The true Service (*P. Sorbus,* Gærtn.) is a very different plant, more like the Mountain Ash, and is not a native.

4. **P. A'ria,** *L.*; leaves simple or pinnatifid rarely pinnate at the base, deeply lobed white and flocculent beneath.

Copses and borders of forests, local; ascending to 1,500 ft. in Yorkshire; W. and N. of Ireland; fl. May–June. — A bush or small tree, 4–40 ft. *Leaves* 2–6 in., very variable, glabrous above, plaited, coarsely irregularly serrate. *Flowers* ½ in. diam., in lax corymbs, white. *Fruit* ½ in. diam., subglobose, dotted red.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to the Himalaya.—The following sub-species all run into one another; the leaf characters are taken from flowering branches.

Sub-sp. A'RIA proper; leaves ovate or oblong lobulate or hardly lobed beyond the middle snow-white below, nerves 8–13 on each side.—Mid. England southwards.

Sub-sp. RUPIC'OLA, *Syme;* leaves obovate-oblong lobed above, snow-white below, nerves 5–8 on each side.—Local in England, Scotland, and Ireland.

Sub-sp. INTERME'DIA, *Ehr.* (sp.); leaves oblong rather distantly lobed along the sides ashy-white below, nerves 5–8 on each side. *P. scandica,* Bab.—S. of England; local.

Sub-sp. FEN'NICA, *L.* (var.); leaves oblong pinnatifid snow-white beneath, fruit scarlet. *P. pinnati'fida,* Sm.—Arran Is. in the Clyde.

5. **P. Aucupa'ria,** *Gærtn.;* leaves pinnate, leaflets glabrous below when old or nearly so. *Mountain Ash, Rowan-tree.*

Woods and hillsides, chiefly in mountainous districts; ascending to 2,600 ft. in the Highlands; fl. May–June.—Tree 10–30 ft. *Leaves* 5–8 in.; leaflets 6–8 pair, 1–1½ in., linear-oblong, subacute, serrate, pale below and hairy along the midrib and nerves. *Cymes* 4–6 in. diam., compound, corymbose, dense-flowered. *Flowers* ½ in. diam., cream-white; pedicels and calyx villous. *Berries* ⅓ in. diam., globose, scarlet, flesh yellow, 2–4-celled; endocarp almost woody.—DISTRIB. Europe, Siberia, Dahuria, Madeira.

SECTION 3. **Mes'pilus,** *L.* (gen.). *Fruit* large, 5-celled; cells 1-seeded; endocarp bony. *Flowers* solitary.

P. GERMAN'ICA, *L.* (*Mespilus*); leaves obovate or oblong-lanceolate entire or serrulate. *Medlar.*

Hedges and thickets in Mid. and S. England, but not indigenous; fl. May–June.—A small much-branched spinous tree. *Leaves* subacute, pubescent beneath. *Flowers* 1½ in. diam., white; peduncles ½ in. *Calyx* woolly, lobes with dilated foliaceous tips. *Fruit* ½–1 in. diam., globose, with a large depressed area at the top, and persistent calyx-lobes.—DISTRIB. Europe from Holland southwards, N. Africa? W. Asia.

13. CRATÆ'GUS, *L.* HAWTHORN, WHITETHORN.

Shrubs or small trees, often spiny. *Leaves* simple lobed or pinnatifid; stipules deciduous. *Flowers* in terminal corymbose cymes, white or red; bracts caducous. *Calyx-tube* urceolate or campanulate; mouth contracted; lobes 5, persistent or deciduous. *Petals* 5, inserted at the mouth of the calyx. *Stamens* many. *Carpels* 1–5, adnate to the calyx-tube; styles 1–5, stigma truncate; ovules 2 in each cell, ascending. *Fruit* ovoid or globose, with a bony 1–5-celled stone, or with 5 bony 1- rarely 2-seeded stones.—DISTRIB. N. temp. regions, chiefly American, extending south into New Grenada; species about 50.—ETYM. κράτος, from the *strong* wood.

1. **C. Oxyacan'tha,** *L.*; spinescent, leaves deeply pinnatifid.

Forests and hedges from Moray and Isla southwards, but often only where planted; ascending to 1,800 ft. in Yorkshire; fl. May–June.—A small round-headed tree, 10–20 ft., much branched. *Leaves* 1–2 in., very variable, cuneate, shortly petioled, lobes cut or crenate; stipules leafy, ½-sagittate, toothed. *Cymes* corymbose, many-flowered. *Flowers* ¾ in. diam., white; pedicels and calyx glabrous or pubescent. *Anthers* pinkish-brown. *Carpels* 1–2 very rarely 3. *Fruit* ovoid or subglobose, usually scarlet, rarely yellow or black.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India; introd. in N. America.

Sub-sp. OXYACANTHOI'DES, *Thuill.* (sp.); peduncles and calyx-tube glabrous, carpels 2–3.—Not common.

Sub-sp. MONOGY'NA, *Jacquin* (sp.); leaves more deeply lobed or pinnatifid, peduncles and calyx-lobes pubescent, flowers and fruit smaller (appearing later), carpel solitary.

14. COTONEAS'TER, *Lindl.*

Shrubs or small trees. *Leaves* coriaceous, often downy; stipules deciduous. *Flowers* solitary or in few-flowered axillary or terminal cymes, small, white or pink, sometimes polygamous. *Calyx-tube* turbinate or campanulate; lobes 5, short, persistent. *Petals* 5. *Stamens* many, inserted at the mouth of the calyx. *Carpels* 2–5, adnate wholly or by their backs only to the calyx-tube; styles 2–5, free, stigma truncate; ovules 2 in each cell, erect. *Fruit* small, ovoid, globose, or turbinate, with 2–5 bony 1-seeded stones.—DISTRIB. Europe, temp. Asia, N. Africa, Mexico; species 15.—ETYM. The old Latin name.

1. **C. vulgar'is,** *Lindl.*; leaves broadly elliptic-oblong densely pubescent beneath, cymes lateral, few-flowered.

Great Orme's Head, on limestone cliffs, very rare; a native? *Watson;* fl. May–June.—A small erect shrub; branchlets pubescent. *Leaves* ¾–1½ in., rounded or acute at the tip; petiole very short; stipules scarious. *Flowers* ½ in. diam., pink; pedicels short, decurved, pubescent; bracts minute. *Calyx* turbinate, lobes obtuse, margins woolly. *Petals* small, persistent. *Styles* about 3. *Fruit* ¼ in. diam., globose, shining, red.—DISTRIB. Europe, Siberia, Dahuria, W. Asia to the Himalaya.

ORDER XXVIII. SAXIFRAGEÆ.

Tribes SAXIFRAG'EÆ proper and RIBE'SIEÆ.

Shrubs or herbs. *Leaves* alternate or opposite; stipules 0, or adnate to the often dilated petiole. *Calyx* free or more or less adnate to the ovary, 5- rarely 4-lobed, valvate or imbricate in bud. *Petals* 5, rarely 4 or 0, imbricate in bud. *Stamens* 5 or 10, rarely 4 or 8, perigynous, free; anthers dorsally inserted, connective frequently glandular at the back. *Disk* tumid, annular or glandular. *Carpels* 2 or more, usually connate into a 2- rarely a 1-celled ovary; styles as many as cells, free or combined, stigmas capitellate; ovules many, 2-seriate, placentas attached to the inner angles of the cells, parietal in the 1-celled ovaries. *Fruit* a 1–3-celled berry or capsule, or of 2 or more follicles, many-seeded. *Seeds* small, albumen copious fleshy or horny; embryo minute, terete or clavate.—DISTRIB. (of the British tribes). Temp. and Arctic regions of the N. hemisphere; a few occur on lofty tropical mountains and in the S. hemisphere; genera 19; species 250.—AFFINITIES. So close to *Rosaceæ* and *Crassulaceæ* as to be scarcely separable; also allied to *Lythraceæ, Rhizophoreæ,* and *Droseraceæ.*—PROPERTIES unimportant.

TRIBE I. **SAXIF'RAGEÆ** proper. Herbs. *Flowers* 4–5-merous. *Ovary* 1–3-celled. *Petals* 5. *Stamens* 10. *Fruit* capsular.

Ovary 2-celled; styles 2 ..... 1. Saxifraga.
Petals 0. Stamens 8 or 10. Ovary 1-celled; styles 2..... 2. Chrysosplenium.
Petals 5. Stamens 5. Ovary 1-celled; stigmas 3–4..... 3. Parnassia.

TRIBE II. **RIBE'SIEÆ.** Shrubs. *Ovary* 1-celled. *Fruit* a berry. 4. Ribes.

1. SAXIF'RAGA, *L.* SAXIFRAGE.

Perennial, rarely annual herbs. *Leaves* various, radical and cauline; petiole sheathing. *Flowers* cymose white or yellow, rarely red or purple. *Calyx-tube* free or partially adnate to the ovary; lobes 5, imbricate. *Petals* 5. *Stamens* 10, rarely 5. *Ovary* superior or partially inferior, 2-lobed, 2-celled; styles 2; placentas on the inner angles of the cells. *Capsule* 2-beaked, 2-valved between the beaks, many-seeded. *Seeds* small, smooth or rough.—DISTRIB. N. and S. temp. and Arctic zones; absent in Australia, S. Africa, and the Pacific; species 160.—ETYM. *Saxum* and *frango,* from this species rooting into *rocks* and *breaking* them up.

SECTION 1. **Porphyr'ion,** *Tausch.* Perennial. *Stems* trailing, leafy. *Leaves* opposite, small, with a pore at the tip, ciliate. *Flowers* solitary, subsessile. *Sepals* erect in fruit.

1. **S. oppositifo'lia,** *L.*; tufted, leaves small 4-farious ovate-oblong.

Alpine rocks, from Wales northwards; ascending to near 4,000 ft. in the Highlands; N.W. and N. Ireland; fl. April–May.—Glabrous, dark green, depressed. *Stems* 6–8 in., creeping. *Leaves* ¼ in., 4-fariously imbricate, thickened and obtuse at the tip, ciliate with stout bristles. *Flowers* ½ in. diam., sessile on short annual shoots, campanulate. *Sepals* obtuse, connate to the middle. *Petals* obovate, bright purple. *Capsule* free, ½ in.; beaks diverging, subulate.—DISTRIB. Arctic and Alpine Europe, Asia and America, W. Asia to the Himalaya.

SECTION 2. **Micran'thes,** *Haw.* (gen.). Perennial, stemless, scapigerous. *Radical leaves* petioled. *Cymes* dense-flowered. *Sepals* adnate to the base of the carpels. *Petals* white.

2. **S. niva'lis,** *L.*; leaves broadly spathulate crenate-dentate.

High alps, between 2,000 and 4,300 ft., of Snowdon, Westmoreland, Argyle, Perth, Aberdeen, and Ben Bulbon in Sligo; fl. July–Aug.—Glandular-hairy on the leaf-margins, scape, bracts and pedicels, elsewhere glabrous. *Rootstock* small. *Leaves* ½–1 in. diam., subcoriaceous, red beneath; petiole 1–2 in. *Scape* 3–6 in., erect, simple. *Flowers* ¼ in. diam., white, in capitate 4–12-flowered cymes. *Bracts* linear. *Calyx-lobes* connate, purplish. *Capsule* with short divergent beaks.—DISTRIB. Alpine and Arctic Europe, N. Asia, E. and W. N. America.

SECTION 3. **Hydat'ica** and **Arabide'a,** *Haw.* (gen.). Perennial, scapigerous. *Stem* short or 0. *Cymes* lax-flowered. *Sepals* almost free, reflexed. *Petals* white with 2 purple dots above the base.

3. **S. stella'ris,** *L.*; stemless, leaves rosulate subsessile cuneate-lanceolate coarsely toothed, scape leafless, filaments subulate.

Alpine and subalpine rills, from Wales northwards, and in Ireland; ascending to 4,300 ft.; fl. June–July.—Glabrous or sparsely hairy. *Rootstock* small, branched. *Leaves* ½–1 in., subsucculent, ciliate. *Scape* 3–8 in.; cyme panicled. *Flowers* few, ⅓ in. diam., white; anthers and pistils red; bracts linear. *Sepals* lanceolate. *Capsule* with suberect slender beaks.—DISTRIB. Arctic and Alpine Europe, N. Asia, N. America.

4. **S. umbro'sa,** *L.*; more or less glandular-hairy, leaves petioled orbicular or broadly ovate coarsely crenate or toothed, base rounded cuneate or reniform, filaments dilated slightly upwards.

Mts. in W. and S.W. of Ireland; naturalized elsewhere; fl. June–July.—*Leaves* ½–2 in. diam., rosulate, coriaceous; petioles ½–1 in., ½-terete or flattened. *Scape* 6–12 in., leafless. *Cyme* panicled; bracts linear. *Flowers* ¼ in. diam., white, sometimes sprinkled with red. *Sepals* reddish. *Anthers* red. *Capsule* with short divergent beaks.—DISTRIB. N. of Spain and Portugal.

Sub-sp. UMBRO'SA proper; leaves obovate or suborbicular suddenly contracted into a short broad petiole crenate or toothed.—VAR. 1, *umbro'sa* proper; leaves compactly rosulate oblong-obovate crenate. W. and S. of Ireland; ascending to 3,400 ft.; naturalized in woods elsewhere. *London Pride, St. Patrick's Cabbage.*—VAR. 2, *puncta'ta,* Haworth (sp.); leaves loosely rosulate orbicular crenate-serrate.—VAR. 3, *serratifo'lia,* Mackay (sp.); leaves ascending obovate sharply-toothed sometimes with intermediate teeth, var. *duplicato-serra'ta,* Lond. Cat.

Sub-sp. GE'UM, *L.* (sp.); leaves orbicular more or less reniform or cordate crenate or toothed, petiole slender.—VAR. 1, *serra'ta*, Syme; leaves cordate crenate or toothed. Mts. of Kerry and Cork.—VAR. 2, *el'egans*, Mackay (sp.); leaves abruptly narrowed into the short petiole, acutely toothed. A transition form to sub-sp. *umbro'sa*.—VAR. 3, *crena'ta*, Syme; leaves deeply cordate obtusely crenate. A naturalized form, woods, N. of England and Scotland.—VAR. 4, *grac'ilis*, Mackay (M.S. sp.); leaves orbicular hairy on both surfaces. Connor Hill, Dingle.

Sub-sp. HIRSU'TA, *L.* (sp.); more hairy, leaves long-petioled broadly ovate margins cartilaginous sharply toothed or serrate rounded at the base or narrowed into the petiole. Kerry and Cork, local and rare.

S. ANDREWSII, *Harvey;* leaves linear-spathulate sessile obtuse glabrous coriaceous, margin membranous ciliate, cyme panicled, filaments subulate, sepals connate at the base hardly adnate to the ovary.

Stated to have been found at the head of Glen Caragh, Kerry, but no indigenous specimens exist. It is identical with *S. Guthriana*, Hort., a hybrid between *S. umbrosa* and a species of the *Aizoon* group.

SECTION 4. **Hir'culus,** *Haw.* (gen.). Perennial. *Stem* leafy. *Leaves* alternate, linear-lanceolate or oblong, entire or toothed. *Sepals* free or ¼-adnate to the ovary, spreading or reflexed. *Petals* yellow.

5. **S. Hir'culus,** *L.*; stem subsimple erect leafy stoloniferous, flowers subsolitary, sepals free reflexed, capsule superior.

Bogs and wet moors; rare and local; Clackmannan, Lanark, Perth; ascending to 2,100 ft. in Yorkshire; Antrim, W. Meath and Tipperary; fl. Aug.—Pubescent above, 4–8 in., branched from the base. *Radical leaves* ½–1½ in., rosulate, petioled, lanceolate or spathulate; cauline linear, sometimes faintly serrulate. *Flowers* 1–2¾ in. diam. *Sepals* ciliate. *Petals* obovate, dotted red at the base, where there are 2 tubercles. *Capsule* with short divergent beaks.—DISTRIB. Arctic and Alpine Europe, N. Asia, N. America, Himalaya.

6. **S. aizoi'des,** *L.*; stems tufted decumbent leafy much branched, leaves linear-oblong crowded below, scattered on the flowering stems, sepals erect connate, adnate below to the ovary.

Stony places by alpine and subalpine rills; ascending to 3,000 ft. in the Highlands; common in Ireland; absent from Wales; fl. June–July.—Often forming bright green cushions a foot across; branches 3–8 in. *Leaves* ½–2 in., spreading, lower reflexed, often ciliate (*S. autumna'lis*, L.); on the flowering stem narrower, strongly ciliate. *Flowers* 1–10, ½ in. diam., orange or golden yellow, dotted red. *Calyx-tube* obconic. *Petals* narrowly obovate-spathulate, distant. *Ovary* orange, depressed. *Capsule* with erecto-patent, subulate beaks.—DISTRIB. Alpine and Arctic Europe, N. Asia, N. America.

SECTION 5. **Nephrophyl'lum,** *Gaud.* Annual or perennial. *Leaves* chiefly radical, broad, palmately lobed. *Sepals* suberect, more or less connate and adnate to the ovary. *Petals* white.—Hairs articulate.

7. **S. tridactyli'tes,** *L.*; annual, stem erect many-flowered glandular-hairy, leaves cuneate 3–5-fid, uppermost entire, petioles broad, calyx-lobes short erect obtuse.

Wall-tops and dry places, E. of Scotland, from Caithness southwards, all England and Ireland, ascending to 1,800 ft. in Yorkshire; fl. April–June. —*Stem* 2–6 in., simple or branched above. *Radical leaves* ½–1 in., rosulate; segments linear-oblong, outer cleft. *Cyme* subracemose; bracts sub-opposite; pedicels slender. *Flowers* ⅛ in. diam., erect, white. *Calyx-tube* oblong. *Petals* small. *Capsule* inferior; beaks short, divergent.—DISTRIB. Europe, N. Africa, E. Siberia, W. Asia.

8. **S. rivula'ris,** *L.*; perennial, stems decumbent rooting 1–3-flowered, leaves reniform palmately 5-lobed, petioles slender, calyx-lobes acute.

Alpine damp rocks and streams, between 3,000 and 3,600 ft.; Ben Lawers, Braemar, Ben Nevis; fl. July–Aug.—Tufted, slender, succulent, 1–4 in., slightly glandular-hairy. *Leaves* ½–1 in. diam., lobes entire; petioles as long as the stems. *Flowers* 1–2, ¼ in. diam., erect, white; bracts leafy, opposite, usually undivided. *Calyx-tube* ½ as long as the lobes, hemispherical. *Petals* distant, small, obovate-oblong. *Capsule* with short divergent beaks.—DISTRIB. Arctic and sub-Arctic Scandinavia, Siberia, E. and W. N. America.

9. **S. cer'nua,** *L.*; perennial, stem erect simple 1–3-flowered, leaves petioled reniform palmately deeply crenate or lobulate, cauline sessile with axillary scarlet buds, calyx-lobes erect obtuse.

Schistose rocks near the top of Ben Lawers, alt. 4,000 ft.; fl. July.—Sparingly glandular-hairy, 2–6 in., leafy. *Rootstock* with scaly buds at its top. *Radical leaves* ½–¾ in. diam., often tinged red; cauline more deeply lobed. *Flowers* ½–⅔ in. diam., campanulate, drooping, white, rarely produced in Britain. *Calyx-tube* very short. *Petals* large, obovate.—DISTRIB. Arctic and Alpine regions of Europe, N. Asia, America, and the Himalaya.—I doubt if this is more than an alpine and arctic state of *S. granulata*.

10. **S. granula'ta,** *L.*; glandular-pubescent, stem erect bulbiferous at the base branched and many-flowered above, leaves petioled reniform palmately lobulate cauline sessile, calyx-lobes erect obtuse.

Sandy banks and meadows from Aberdeen southwards, ascending to 1,500 ft. in Yorkshire; rare in Ireland; fl. April–May.—Gregarious, glandular-hairy. *Bulbs* as large as a pea, brown. *Stem* 6–18 in. *Radical leaves* ¾–1½ in. diam.; petioles slender; cauline deeper and more acutely cut. *Flowers* 1 in. diam., campanulate, inclined or drooping, white. *Petals* large, obovate. *Calyx-lobes* as long as the tube. *Stigmas* large, reniform. *Capsule* with slender beaks.—DISTRIB. Europe, N. Africa, W. Asia to the Himalaya.

SECTION 6. **Dactyloi'des,** *Tausch.* Perennial, tufted, with many flowerless leafy shoots (except *S. cæspitosa*). *Leaves* alternate, palmately-partite or lobed. *Sepals* connate at the base and adnate to the ovary, suberect. *Flowers* white.—Hairs articulate, glandular.

11. **S. cæspito'sa,** *L.*; flowerless shoots short densely tufted, leaves cuneate 3–5-lobed, lobes subparallel obtuse, calyx-tube oblong or sub-cylindric, lobes short erect, upper ⅓ of carpels free.

Very rare and local, Ben Nevis, and Ben Avon, at about 3–4,000 ft. elevation; fl. July–Aug.—*Tufts* compact, bright green. *Flowering-shoots* 2–4 in., sparingly leafy. *Leaves* with the broad compressed petioles ½–¾ in., lobed to or beyond the middle, upper cauline undivided. *Flowers* ⅓ in. diam.,

few, crowded, small, campanulate, white. *Calyx* green; lobes short, obtuse. *Capsule* almost included in the calyx-tube, beaks short, subercct, exserted. —DISTRIB. Alps and Arctic regions of Europe, N. Asia, and N. America.—Though amongst a large suite of Arctic specimens of this plant some occur which are inseparable from states of *hypnoïdes*, sub-sp. *hirta*, this is usually so well marked a plant that I incline to regard it as distinct.

12. **S. hypnoi'des**, *L.*; flowerless shoots usually elongate, leaves cuneate 3–5-cleft, lobes divergent acute, those of the shoots often entire, calyx-tube short obconic or hemispheric, lobes usually spreading.

Alpine and subalpine districts, from N. Somerset and Glamorgan northwards; ascending to near 4,000 ft. in the Highlands; frequent in Ireland; fl. May–July.—*Tufts* often forming large cushions, glabrous or glandular hairy. *Leaves* lax or dense, with the broad compressed petioles ½–1 in.; lobes entire or the lateral cleft, flat or channelled. *Flowering-shoots* 3–18 in., stout or slender, leafy or nearly naked, their leaves simple, linear, or broad and more or less lobed like the radical. *Flowers* ½–1 in. diam., few or many, campanulate, white. *Sepals* rarely connate above the middle, oblong linear or ovate, obtuse or acute. *Capsule* not concealed in the calyx-tube, beaks suberect.—DISTRIB. W. and Mid. Europe from Belgium to Spain and Austria, Iceland and Greenland.

Sub-sp. HYPNOI'DES proper; leaves of flowerless shoots entire or 3-lobed, leaves or their lobes narrowed from below the middle acuminate or mucronate, calyx-lobes narrow triangular acute.—Common and widely distributed. —VAR. 1, *platypet'ala*, Sm. (sp.); flowerless shoots (at flowering time) with usually 3-cleft leaves and no axillary buds, flowers sometimes pink. *S. elongella*, Sm.; *condensata*, Gmel.—VAR. 2, *gemmif'era*, Syme; flowerless shoots with simple leaves and axillary buds. *S. leptophylla*, Haw.—*S. pygmæa*, Don, doubtfully placed here in *Lond. Cat.*, is a small garden plant like *cæspitosa*, of which nothing satisfactory is known.

Sub-sp. DECIP'IENS, *Ehr.* (sp.) fide Syme; leaves of all the shoots rosulate 3–7-cleft, lobes abruptly acuminate, calyx-lobes ovate obtuse as long as the tube. *S. cæspitosa*, Koch; *palmata*, Smith. Approaches *S. cæspitosa*.—Carnarvonshire.

Sub-sp. HIR'TA, *Don* (sp.); flowerless shoots short, leaves 3-lobed lobes linear suddenly contracted beyond the middle acute, calyx-lobes triangular-ovate subacute.—Alpine rocks; S.W. Ireland.—VAR. 1, *hir'ta* proper, Syme; very hairy, sepals broad, petals obovate flat.—VAR. 2, *affi'nis*, Don (sp.); slightly hairy, sepals narrow, petals oblong margins incurved.—VAR. 3, *incurvifo'lia*, Don (sp.); lobes of leaves incurved obtuse, sepals subacute. A doubtful form.

2. CHRYSOSPLE'NIUM, *L.* GOLDEN SAXIFRAGE.

Small, succulent, annual or perennial herbs. *Leaves* alternate or opposite, exstipulate. *Flowers* minute, green or yellow, in axillary or terminal cymes. *Calyx-tube* urceolate or obconic, adnate to the ovary; lobes 4–5, obtuse, imbricate in bud. *Petals* 0. *Stamens* 8 or 10, inserted on the margin of an epigynous disk, filaments short. *Ovary* inferior, 1-celled, 2-lobed at the top; styles short, recurved; ovules many, placentas 2 parietal. *Capsule* ½-superior, 2-lobed, membranous, opening at the top by a cruciate mouth. *Seeds* oblong or compressed.—DISTRIB. N. temp. and Arctic regions, temp. S. America; species 15.—ETYM. χρυσός and σπλήν, *golden spleen*, of doubtful application.

1. **C. alternifo'lium,** *L.*; stem simple erect, leaves alternate.

Banks of streams and wet places, from Nairn and Elgin southwards to Kent and Dorset; ascending to near 3,200 ft. in the Highlands; N. of Ireland only; fl. April–June.—Perennial. *Stems* 2–4 in., tufted, glabrous above, clothed below with soft white hairs. *Radical leaves* ¾–2 in. diam., long-petioled, reniform, crenate; cauline few. *Flowers* ⅛ in. diam., 4-merous, yellow, in compact leafy cymes. *Calyx-lobes* obtuse, spreading. *Capsule* almost inferior, beaks short. *Seeds* smooth.—DISTRIB. Europe (Arctic), Siberia to Kamtschatka, W. Asia to the Himalaya, N. America.

2. **C. oppositifo'lium,** *L.*; stem creeping below, leaves opposite.

Marshy and shady places, ascending to 3,300 ft. in the Highlands; rare in the south; fl. May–July.—Size and general habit of *C. alternifolium*, but stem more leafy, branched, creeping and rooting at the base; leaves ½–1 in. diam., nearly orbicular, suddenly contracted into a short broad petiole; cauline many.—DISTRIB. Europe, Siberia.

3. PARNAS'SIA, *L.* GRASS OF PARNASSUS.

Slender, stemless, glabrous, scapigerous, perennial herbs. *Leaves* radical, quite entire, exstipulate. *Flower* solitary, large, yellow or white. *Calyx-tube* short, free or adnate to the base of the ovary; lobes 5, imbricate, persistent. *Petals* 5, thickish, persistent. *Stamens* 5, hypogynous or perigynous, alternating with 5 staminodes. *Ovary* superior or ½-inferior, 1-celled; style short, stigmas 3–4 opposite the parietal placentas; ovules many. *Capsule* membranous, loculicidally 3–4-valved, many-seeded. *Seeds* small, testa lax, albumen scanty.—DISTRIB. Arctic, Alpine, and temp. regions of the N. hemisphere from S. India northwards; species 12.

1. **P. palus'tris,** *L.*; leaves ovate-cordate, stamens hypogynous.

Wet moors and bogs, from Hampshire and Somerset northwards, ascending to 2,700 ft. in the Highlands; most common in the north; fl. Aug.–Sept.—Glabrous. *Radical leaves* 1–2 in., ovate-cordate; petiole slender 2–3 in. *Scape* slender, angular, twisted, with one sessile leaf about the middle. *Flower* ½–1 in. diam. *Sepals* nearly free, obtuse. *Petals* coriaceous, with strong veins. *Staminodes* with a fan-shaped tuft of white gland-tipped filaments. *Ovary* globose, superior; stigmas 4.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to the N. W. Himalaya, E. and W. N. America.

4. RI'BES, *L.* CURRANT, GOOSEBERRY.

Shrubs, often glandular and spinous, buds scaly. *Leaves* alternate, entire or lobed, plaited or convolute in bud; stipules 0, or adnate to the petiole. *Flowers* solitary or racemose, white red yellow or green, often polygamous; pedicels bracteate (often minutely), 2–3-bracteolate. *Calyx-limb* tubular or campanulate, 4–5-fid, imbricate or subvalvate in bud. *Petals* small and stamens 4–5, inserted in the throat of the calyx. *Ovary* inferior, 1-celled; styles 2; ovules few or many, on 2 slender parietal placentas. *Berry* oblong or globose, 1-celled, few or many-seeded. *Seeds* horizontal, testa with a gelatinous coat, raphe free, albumen adhering to the testa; embryo minute.—DISTRIB. N. Temp. regions and Andes of S. America; species 56.—ETYM. An Arabic word for *Rheum*, wrongly applied to this genus.

SECTION 1. **Grossula'ria.** *Branches* spinous. *Leaves* plaited in bud. *Peduncles* 1–3-flowered.

1. **R. Grossula'ria,** *L.*; leaves orbicular 3–5-lobed. *Wild Gooseberry.*
Copses in the hilly districts of the N. of England, ascending to near 1,000 ft.; an escape elsewhere; fl. April–May.—A small spreading shrub with 1–3 spines under the leaf-buds. *Leaves* 1–2 in. diam., fascicled on short lateral branches, lobes irregularly crenate. *Flowers* ¼ in., greenish, drooping; peduncle short, pubescent, 1–3-bracteate about the middle. *Calyx-lobes* reflexed, purplish, throat and stamens bearded. *Petals* white, erect, minute. *Fruit* ½–1 in.—DISTRIB. Europe, N. Africa, N.W. Himalaya.
VAR. 1, *Grossula'ria* proper; leaves shining above, fruit glandular-hairy.—VAR. 2, *Uva-cris'pa,* L. (sp.); leaves smaller, ripe fruit glabrous.

SECTION 2. **Ribe'sia.** *Branches* not spinous. *Leaves* plaited in bud. *Racemes* many-flowered.

2. **R. alpi'num,** *L.*; dioecious, leaves deeply 3–5-lobed coarsely serrate almost glabrous and shining beneath, racemes glandular erect in flower and fruit, bracts exceeding the pedicels.
Woods in the N. of England, indigenous in Yorkshire, &c., not so in Scotland or Ireland; fl. April–May.—A small, all but glabrous bush; branches slender. *Leaves* 1½–2 in. diam., broadly ovate, lobes usually 3 acute cut and serrate; slender petiole and both surfaces sparingly hairy. *Racemes* glandular-pubescent; male 2–2½ in., 20–30-flowered; female shorter, 8–10-flowered. *Flowers* ⅛ in. diam., yellowish; bracts linear. *Petals* much shorter than the calyx-lobes. *Styles* very short, cleft. *Fruit* ¼ in. diam., globose, scarlet, insipid.—DISTRIB. Europe, Siberia to Kamtschatka, Himalaya, N. America, Labrador.

3. **R. ru'brum,** *L.*; leaves 3–5-angled and lobed, base cordate, lobes triangular-crenate, racemes drooping in fruit eglandular, bracts shorter than the pedicels. *Wild Currant.*
Woods and thickets from Mid. Scotland southwards, ascending to 1,000 ft. in Yorkshire, usually an escape; not a native of Ireland; fl. April–May.—*Leaves* 2–4 in. diam., glabrous or pubescent above, usually tomentose beneath; petiole pubescent or setose. *Racemes* 1–3 in., many-flowered, pubescent or glabrous, never glandular; bracts ovate. *Flowers* ¼ in. diam. *Calyx* glabrous, limb flat. *Petals* minute. *Fruit* ¼ in. diam., red, acid.—DISTRIB. Europe, Siberia to Kamtschatka, N.W. Himalaya, E. and W. N. America.
VAR. 1, *sylves'tre,* Reich.; leaves hairy above tomentose beneath, raceme pubescent usually suberect in flower and drooping in fruit, flowers purplish, filaments very short, fruit contracted at the top, pedicels equalling or exceeding the fruit. Vars. *Smithia'num* and *Bromfieldia'num,* Syme. *R. petræ'um,* Sm. not of Wulfen.—VAR. 2, *spica'tum,* Robson (sp.); leaves hairy above when young and tomentose beneath, fruit as in VAR. 1, its pedicels short. Isle of Skye.—VAR. 3, *sati'vum,* Reich.; leaves glabrous on both surfaces when mature, racemes glabrous always drooping, flowers green, fruit globose. An escape from cultivation.

4. **R. ni'grum,** *L.*; leaves angled 5–7-lobed glandular-dotted beneath, lobes triangular acute serrate, racemes drooping lax-flowered, bracts minute, pedicels long. *Black Currant.*

Woods, &c. from Mid. Scotland southwards, probably always a garden escape; an alien or denizen, *Watson;* fl. April–May.—A stout erect bush, smelling strongly when bruised. *Leaves* 2–3 in. diam., similar to those of *R. rubrum*, but rather deeper lobed; petioles slender, pubescent. *Racemes* slender, tomentose, eglandular, few-flowered. *Flowers* ¼–⅓ in. diam.; pedicels ½ in. *Calyx* campanulate, glandular. *Petals* minute. *Berry* ⅜ in. diam., globose, black.—DISTRIB. Europe, Siberia, Dahuria, W. Himalaya.

ORDER XXIX. CRASSULA'CEÆ.

Herbs or shrubs, usually succulent. *Leaves* opposite or alternate, exstipulate. *Flowers* in terminal or axillary cymes, bracteate or not. *Sepals* 3–5, rarely 10–12 or more, free or connate. *Petals* as many, free or connate, imbricate in bud. *Stamens* perigynous or almost hypogynous, as many as the petals, or twice as many, when those opposite the petals are adnate to their bases; anthers dorsally fixed. *Hypogynous scales* opposite each carpel, rarely 0. *Carpels* 3–5, rarely more, 1-celled, free, rarely connate; styles short or long, stigma small; ovules many, rarely few, attached to the ventral suture, erect or pendulous. *Fruit* of 3 or more membranous or coriaceous 1-celled many-seeded follicles. *Seeds* oblong, minute, albumen fleshy; embryo terete.—DISTRIB. Arctic, temp. and warm regions, but chiefly S. African; genera 14; species 400.—AFFINITIES. With *Saxifragæ*, and separable only by habit or the hypogynous scales, or both.—PROPERTIES. Astringent roots, acrid foliage, emetic and purgative qualities, and tartaric and malic acids occur.

Leaves opposite.	Petals 3–5 free.	Stamens 3–5	1. Tillæa.
Leaves alternate.	Corolla 5-lobed.	Stamens 10	2. Cotyledon.
Leaves alternate.	Petals usually 5, free.	Stamens usually 10	3. Sedum.
Leaves alternate.	Petals 6–20.	Stamens 12–40	3*. *Sempervivum*.

1. TILLÆ'A, *L.*

Small or minute subsucculent herbs. *Leaves* opposite, quite entire. *Flowers* minute, axillary solitary or cymose, white or reddish. *Calyx* 3–5-lobed or -parted. *Petals* 3–5, free or connate at the very base. *Scales* 3–5, linear, or 0. *Carpels* 3–5; styles short; ovules 1 or more. *Follicles* few or many-seeded.—DISTRIB. Ubiquitous; species 20.—ETYM. M. A. Tilli, an early Italian botanist.

1. **T. musco'sa,** *L.*; leaves oblong, flowers solitary subsessile 3-merous. Sandy heaths in England, rare, Norfolk, Suffolk, Hants, Dorset, Devon; fl. June–July.—Annual. *Stems* 1–2 in., tufted, decumbent, glabrous, reddish; branches slender, leafy and flowering throughout. *Leaves* thick, concave, obtuse or apiculate. *Flowers* rarely 4-merous. *Sepals* ovate, acuminate, green. *Petals* smaller, subulate, white. *Scales* 0. *Follicles* constricted, 2-seeded.—DISTRIB. W. Europe from Holland southwards, N. Africa.

2. COTYLE'DON, *L.* PENNYWORT, NAVELWORT.

Herbs or small shrubs. *Leaves* opposite or alternate, sometimes peltate. *Flowers* in terminal spikes or racemes. *Calyx* 5-parted. *Corolla-tube* urceolate or cylindric, terete or 5-angled; lobes 5, small, twisted in bud.

Stamens 10, inserted in the tube of the corolla. *Scales* 5, linear-oblong or 4-angular. *Carpels* 5; styles filiform; ovules many. *Follicles* many-seeded.—DISTRIB. W. and S. Europe, all Africa, temp. Asia, Mexico; species 60.—ETYM. κοτυλή, from the *cup*-like leaf of some species.

1. **C. Umbil'icus,** *L.*; leaves peltate orbicular crenate, raceme long.

Rocks and walls, especially on the W. coasts from Argyle southwards; ascending to 1,000 ft. in Wales; throughout Ireland; fl. June–July.—Glabrous. *Rootstock* tuberous. *Stem* 6–18 in., simple, stout, terete. *Radical leaves* 1–3 in. diam., petioled, depressed in the centre; cauline spathulate, upper cuneate. *Raceme* continued almost throughout the stem, sometimes leafy (var. *foliosa*); bracts minute; pedicels short, slender. *Flowers* close-set drooping, green. *Corolla* cylindric, shortly 4–5-lobed. *Stamens* adnate to the corolla-tube, included.—DISTRIB. Europe from France southwards, W. Asia, Mts. of N. and trop. Africa.

3. SE'DUM, *L.* ORPINE, STONECROP.

Succulent herbs, erect or prostrate. *Leaves* opposite alternate or whorled. *Flowers* cymose, rarely axillary and solitary, sometimes dicœcious. *Calyx* 4–5-lobed. *Petals* 4–5, free. *Stamens* 8–10, alternately opposite and often adnate to the petals. *Scales* 4–5, entire or notched. *Carpels* 4–5, free or connate at the base; styles short; ovules many. *Follicles* many or few-seeded.—DISTRIB. N. temp. and cold regions, rare in America; species 120.—ETYM. *sedeo*, from the *squatting* habit of the species.

SECTION 1. **Tele'phium.** *Rootstock* stout, perennial. *Stems* annual. *Leaves* broad or concave.

1. **S. Rhodi'ola,** *DC.*; leaves alternate sessile, flowers 8-merous dicœcious. *Rhodi'ola ro'sea,* L. *Rose-root.*

Moist alpine and subalpine rocks, from S. Wales northwards; ascending to near 4,000 ft. in the Highlands, also on maritime rocks in Scotland; common in Ireland; fl. May–Aug.—*Rootstock* 2–3 in., as thick as the thumb, branched, woody, cylindric, scent of roses; buds scaly. *Stems* 6–18 in., fleshy. *Leaves* 1–1½ in., glaucous, larger and more crowded upwards, obovate-oblong or lanceolate, acute, toothed at the tip. *Cymes* compact, corymbose. *Flower* ¼ in. diam., yellow or purplish. *Sepals* narrow. *Petals* linear, smaller or 0 in the female flower. *Scales* notched.—DISTRIB. W. Europe (Arctic), Himalaya, E. and W. N. America.

2. **S. Tele'phium,** *L.*; leaves subsessile, flower 5-merous hermaphrodite. *Orpine.*

Stony hedgebanks and copses, &c. from Argyle southwards, local; ascending to 1,200 ft. in Yorkshire; very rare in Ireland; often a garden escape; fl. July–Aug.—*Rootstock* short, stout; roots many, elongate, tuberous. *Stems* 6–24 in., stout, green or spotted red. *Leaves* 1–3 in., rarely opposite below, ovate or oblong, obtuse, flat or concave, obtusely toothed or serrate. *Cymes* dense, corymbose. *Flowers* ½ in. diam., rosy white or speckled. *Sepals* ovate-lanceolate. *Petals* twice as long, lanceolate.—DISTRIB. Europe, Siberia to Kamtschatka, W. Asia to the Himalaya.

VAR. 1, *purpuras'cens,* Koch (sp.); upper leaves sessile rounded at the base, carpels furrowed at the back.—VAR. 2, *Faba'ria,* Koch (sp.); more slender, upper leaves all cuneate at the base, carpels not furrowed. Common.

SECTION 2. **Cepæ'a.** Annual or biennial. *Stem* simple. *Leaves* sub-cylindric.

3. **S. villo'sum,** *L.*; glandular-pubescent, leaves sessile ½-cylindric.

Bogs and marshes in hilly districts from York and Westmoreland to Argyle and Elgin, ascending to 2,000 ft. in Yorkshire; absent from Ireland; fl. June–July.—Biennial. *Stem* with a tuft of leaves the first year, lengthening in the second, then slender, 3–6 in., and flowering. *Leaves* ¼–⅓ in., scattered, linear, obtuse. *Cyme* few-flowered, subscorpioid. *Flowers* ¼ in. diam., white or purplish. *Sepals* ovate, obtuse *Petals* broad, acute.—DISTRIB. W. Europe (Arctic), Norway to Italy and Hungary, Greenland.

SECTION 3. **Se'dum** proper. Perennial. *Stems* branched, with many flowerless leafy prostrate or ascending shoots. *Leaves* cylindric or ½-cylindric.

* *Flowers white.*

4. **S. al'bum,** *L.*; glabrous or slightly glandular, leaves alternate sub-cylindric oblong contracted at the base, petals oblong-lanceolate.

Malvern Hills, Gloucestershire, and Somerset, indigenous (Syme); a garden escape on walls from Forfar southwards; an alien, *Watson;* fl. July–Aug.—*Flowerless stems* prostrate; flowering erect, 6–10 in. *Leaves* ⅛–½ in., obtuse, bright green. *Cyme* corymbose, glabrous. *Flowers* ⅛–¼ in. diam. *Petals* twice as large as the green sepals.—DISTRIB. Europe, Siberia.

VAR. 1, *teretifo'lium,* Haw. (sp.); leaves much flattened above, sepals and petals obtuse.—VAR. 2, *micran'thum,* Bast.; leaves flattened on both surfaces, sepals rounder, petals more acute. Naturalized in Sussex, Ireland, &c.

5. **S. ang'licum,** *L.*; glabrous, leaves alternate ovoid-oblong gibbous at the base below, petals lanceolate acuminate keeled.

Rocks and banks, chiefly by the sea on the W. coasts, but ascending to 3,300 ft. in N. Wales; all round Ireland; fl. June–Aug.—Tufts matted, pale green or reddish. *Flowering stems* 1–2 in., ascending, leafy. *Leaves* ⅛–¼ in., crowded, tumid at the base. *Cymes* short, scorpioid. *Flowers* ⅓ in. diam., few, crowded at the top of the flowering stem, white, or pink. *Sepals* obtuse, short. *Carpels* pink.—DISTRIB. W. Europe.

S. DASYPHYLLUM, *L.*; glandular-pubescent, glaucous, leaves on the flowerless shoots mostly opposite subglobose or shortly ovoid equal at the base below.

Old walls, &c. in Mid. and S. England; Wales and Scotland, rare; an alien, *Watson;* fl. June–July.—Loosely tufted, very glaucous and pink, much branched. *Flowerless stems* short, with rosulate leaves; flowering 2 in., flexuous, slender. *Leaves* ⅛–¼ in. *Cyme* forked, few-flowered. *Flowers* ⅓ in. diam. *Petals* often streaked with pink.—DISTRIB. S.W. and S. Europe.

** *Flowers yellow.*

6. **S. a'cre,** *L.*; glabrous, leaves densely imbricate alternate erect terete ovoid-oblong, sepals slightly gibbous at the base, petals lanceolate acuminate. *Biting Stone-crop, Wall-pepper.*

Rocks, walls, and sandy places, especially near the sea; ascends to 1,500 ft. in Yorkshire; fl. June–July.—Tufts or cushions 3–10 in. diam. *Stems* 3–5 in. *Leaves* ⅛–¼ in., obscurely 6-seriate, broadest at the base, gibbosity in contact

with the stem. *Flowers* ½ in. diam., few, golden-yellow. *Sepals* obtuse, not half as long as the petals. *Anthers* yellow.—DISTRIB. Europe, N. Africa, Siberia.—Taste acrid; is a vesicant, emetic and cathartic.

7. **S. rupes'tre,** *Hudson;* glabrous, leaves linear-lanceolate flattened gibbous at the base, sepals oblong not gibbous at the base.

Rocks in S.W. England and Wales, rare; fl. June–July.—*Stems* stout, loosely tufted, green or tinged with pink; flowerless with closely rosulate leaves; flowering 6–10 in., with suberect scattered leaves. *Leaves* ½–1 in., acute or acuminate, the gibbosity close to the stem. *Cymes* 3–4 in. diam., branches scorpioid. *Flowers* ¾ in. diam., golden yellow. *Sepals* oblong, obtuse. *Petals* lanceolate, acute. *Anthers* yellow.—DISTRIB. Europe from Belgium southwards.—I follow Syme in the diagnosis of the following sub-species.

Sub-sp. EL'EGANS, *Lej.*; glaucous, cyme rather flat-topped.—VAR. 1, *maj'us;* stout, 6–12 in., leaves ¾–1 in., cyme 3–5 in. diam. Cheddar Cliffs.—VAR. 2, *mi'nus;* smaller and more slender. St. Vincent's Rocks, Bristol, Shropshire and Wales, indigenous; elsewhere in England an escape.

Sub-sp. FORSTERIA'NUM, *Sm.* (sp.); more slender, cymes rather round-topped sometimes capitate. Wet rocks; W. Somerset and Wales.

S. SEXANGULA'RE, *L.*; glabrous, leaves cylindric spreading gibbous at the base, sepals not gibbous at the base.

Old walls in the E. of England, not indigenous; fl. July. *Stems* loosely tufted, flowerless with crowded leaves in about 6 rows; flowering 3–6 in., laxer spreading or recurved with leaves ¼ in.; basal gibbosity of the leaf acute, in contact with the stem. *Cyme* 1–2 in. diam., corymbose. *Flowers* ½ in. diam., yellow. *Sepals* obtuse. *Petals* lanceolate, acute.—DISTRIB. Mid. and E. Europe.

S. REFLEX'UM, *L.*; glabrous, leaves crowded cylindric-subulate spreading and reflexed, sepals not gibbous at the base.

On rocks and housetops in England, Wales, and Ireland, not indigenous; fl. July–Aug.—Very similar to *S. rupestre*, but usually much larger, the leaves are almost cylindric, and in about 6 series with subulate tips; the flowers are usually bracteate, often 6-merous.—DISTRIB. Europe.

VAR. 1, *reflex'um* proper; leaves green, those of the flowering shoots reflexed, flowers bright yellow.—VAR. 2, *albes'cens*, Haworth (sp.); smaller, leaves glaucous those of the flowering-stems not reflexed, flowers pale yellow. *S. glaucum*, Sm. Mildenhall, Suffolk; Babbicombe, Devon.

3*. *SEMPERVI'VUM*, *L.* HOUSE-LEEK.

Succulent herbs or undershrubs. *Radical leaves* densely rosulate, stoloniferous from their axils; cauline alternate. *Flowers* in corymbose or panicled cymes. *Calyx* 6–multi-fid or partite. *Petals* as many, free or connate and adnate to the alternate filaments below, narrow, acute. *Stamens* usually twice as many, the alternate sometimes deformed or transformed into carpels. *Scales* various, simple, or connate in pairs, 2-fid or fimbriate, rarely 0. *Carpels* as many as petals, free or connate and adnate with the calyx-tube; styles filiform; ovules many. *Follicles* many-seeded.—DISTRIB. Europe, N. Africa, especially Madeira and the Canaries, W. Asia and the Himalaya; species 40.—ETYM. *semper* and *vivo*, from their retention of vitality.

S. TECTO'RUM, *L.*; perennial, glandular pubescent above, leaves ciliate. Tops of walls and houses, not indigenous; fl. June–July. — Barren shoots 2–4 in. diam., in globose tufts, densely clothed with rosulate leaves; flowering-stems 1–2 ft., erect, stout, with the leaves scattered. *Leaves* 1–2 in., very fleshy, oblong or obovate-lanceolate, mucronate, edged with purple, tips flat. *Cyme* 2–5 in. diam., branches scorpioid. *Flowers* ⅜–1 in. diam., dull red-purple. *Sepals* 12, narrow, acute. *Petals* lanceolate, ciliate. *Stamens* 12, perfect, with as many imperfect or transformed into carpels. *Scales* very small.—DISTRIB. Europe and W. Asia.

ORDER XXX. DROSERA'CEÆ.

Perennial herbs, rarely shrubby below, usually very glandular. *Leaves* radical and rosulate, or cauline and alternate, circinate in bud, stipulate. *Inflorescence* various, often circinate cymes. *Sepals* 4–8, imbricate in bud, persistent. *Petals* 4–8, hypogynous or perigynous, free or connate at the base, imbricate, persistent. *Stamens* 4–20, inserted with the petals, rarely adnate to them; anthers versatile or basifixed, bursting outwards. *Disk* 0, or obscure. *Ovary* free or adherent by a broad base, 1–5-celled; styles 1–5, simple or divided, stigmas simple or multifid; ovules many, parietal, anatropous. *Capsule* 1–5-celled, loculicidally 3-valved, many-seeded. *Seeds* small, albumen fleshy, testa often lax; embryo axile, straight.—DISTRIB. Sandy or marshy places; most common in temp. Australia; genera 6; species 110.—AFFINITIES. Close to *Saxifragaceæ*.—PROPERTIES. Yield a deep red-purple dye, and are said to be acrid and poisonous.

1. DROS'ERA, *L.* SUNDEW.

Slender glandular herbs. *Leaves* alternate or rosulate; stipules scarious, adnate to the petiole or 0. *Flowers* in scorpioid racemes, rarely solitary. *Sepals* and *petals* 4–6 or 8. *Stamens* as many, hypogynous or perigynous. *Ovary* free, ovoid or globose, 1-celled; styles 2–5, free or connate below; ovules in many series, on 2–5-parietal placentas. *Capsule* oblong, 2–5-valved. *Seeds* minute, testa lax; embryo large or small.—DISTRIB. Of the Order; species 100.—ETYM. δροσερός, from the *dew*-like glands.

1. **D. rotundifo'lia,** *L.*; leaves horizontal orbicular or broadly obovate, petiole hairy, testa loose reticulate.

Spongy bogs and heaths; ascending to 2,300 ft. in the Highlands; fl. July–Aug.—*Rootstock* slender. *Stem* very short. *Leaves* ¼–½ in. diam., rosulate, margin glandular, nearly glabrous above; petiole 1–1½ in., gradually dilated at the sheathing base. *Scapes* 3–6 in., axillary; bracts subulate; pedicels short. *Flowers* ¼ in. diam., many, in 2 series, white, usually 6-merous. *Petals* a little longer than the sepals. *Styles* 2-fid, incurved, segments clavate. *Capsule* acute, exceeding the sepals. *Seeds* elongate.—DISTRIB. Europe (Arctic), Siberia, W. Asia, E. and W. N. America, from the Arctic circle to Florida.

2. **D. interme'dia,** *Hayne;* leaves erect obovate or oblong-spathulate, petiole glabrous, testa close granulate. *D. longifolia,* L. in part.

Bogs and moist heaths, from Inverness southwards; local in Scotland; W. of Ireland chiefly; fl. July–Aug. — *Stem* short, leafy. *Leaves* gradually contracted into the petiole, together 1–2 in. *Scapes* 2–4 in., curved at the base. *Flowers* much as in *D. rotundifolia*, usually 5–8-merous. *Capsule* pyriform, equalling the sepals. *Seeds* ovoid. — DISTRIB. Europe (Arctic), W. Asia, E. America from Canada to Brazil.

3. **D. anglica,** *Hudson;* leaves suberect linear-spathulate, petioles glabrous, testa loosely reticulate. *D. longifolia*, L. in part.

Wet moors, ascending to 1,700 ft. in the Highlands; rare in S. England and in Ireland; fl. July–Aug.—Very similar to *D. intermedia*, but larger. *Leaves* ⅛ in. broad; petioles 2–4 in. *Scapes* 4–8 in. *Flowers* ¼ in. diam., 5–8-merous. *Capsule* obovoid, longer than the sepals. — DISTRIB. Europe, Siberia to Kamtschatka, E. and W. America. *D. obovata*, Mert. and, Koch, with broader leaves, styles often notched, capsule half as long as the sepals, seeds imperfect, is probably a hybrid between this and *D. rotundifolia*.— Scotch moors.

ORDER XXXI. HALORAGEÆ.

Herbs or shrubs, often marsh or aquatic, with much-reduced or imperfect perianths. *Leaves* opposite alternate or whorled, exstipulate. *Flowers* often minute and 1-sexual. *Calyx* superior; lobes 2, 4, or 0, valvate or slightly imbricate in bud. *Stamens* 1–8, epigynous in the 2-sexual flowers, filaments usually short; anthers (except in *Callitriche*) long, 4-angled, basifixed and bursting laterally. *Disk* small or 0. *Ovary* inferior, mostly of 2–4 connate (rarely of 1) carpels; styles or stigmas as many as the carpels, except in *Callitriche;* ovules 1 in each cell, pendulous, anatropous. *Fruit* 2–4-celled, dry and indehiscent, or of 1–4 small 1-seeded drupes. *Seed* pendulous, testa membranous, albumen fleshy; embryo cylindric, axile, or minute in the base of the albumen.—DISTRIB. Widely dispersed; genera 9; species 80.—AFFINITIES. Usually placed near *Onagrarieæ*, but differing in the valvate petals, solitary pendulous ovule, separate styles, fleshy albumen, and embryo, and I think much nearer *Saxifrageæ* and *Rhizophoreæ*.—PROPERTIES unimportant.

Leaves all whorled, entire. Stamen and style 1 .....1. Hippuris.
Leaves all or lower whorled, much cut. Stamens 4 or 8....2. Myriophyllum.
Leaves all opposite, quite entire. Stamen 1.....3. Callitriche.

1. HIPPU'RIS, *L.* MARE'S-TAIL.

Glabrous, aquatic herbs. *Stems* stout, erect, simple, leafy. *Leaves* whorled, narrow, quite entire. *Flowers* minute, solitary, axillary, sometimes 1-sexual. *Calyx-tube* subglobose, limb entire. *Petals* 0. *Stamen* 1; anther basifixed. *Ovary* 1-celled, style 1, subulate, stigmatose throughout its length. *Drupe* ovoid, stone crustaceous. *Seed* oblong, albumen scanty.—DISTRIB. Arctic and temp. N. hemisphere, Chili and Fuegia; species 1 or 2.—ETYM. *ἵππος* and *οὐρά, horse-tail.*

1. **H. vulgaris,** *L.*; leaves 6–10 in a whorl linear acute.

Margins of lakes, ponds, &c.; local; fl. June–July.—*Rootstock* submerged, stout, creeping. *Stems* 6–24 in., terete, very many-jointed, as thick as a

goose-quill or less; rarely floating flaccid and flowerless. *Leaves* ½–1½ in., close-set, tips withered. *Flowers* green, sessile. *Anthers* red. *Drupe* minute, smooth, green.—DISTRIB. Of the genus.

2. MYRIOPHYL'LUM, *L.* WATER MILFOIL.

Glabrous marsh or aquatic herbs; branches often floating. *Leaves* opposite alternate or whorled. *Flowers* small, axillary, solitary or spiked; upper male, lower female, intermediate often 2-sexual.—MALE fl. *Calyx* 4- rarely 2-lobed or 0. *Petals* 2 or 4, concave. *Stamens* 2, 4, or 8; anthers long, basifixed, bursting laterally.—FEM. fl. *Calyx-tube* 4-grooved; lobes 4, minute or 0. *Petals* minute or 0. *Ovary* 4- rarely 2-celled. *Styles* 4, very short, plumose; drupes 4. *Seeds* oblong; albumen copious. —DISTRIB. Ubiquitous; species 15. — ETYM. *μυρίος* and *φύλλον*, from the finely-divided *leaves*.

1. **M. verticilla'tum,** *L.*; spike erect in bud, floral leaves all whorled in about fives pinnatifid or pectinate all longer than the flowers, upper axils usually flowerless.

Ditches and ponds, from Northumberland southwards, and in Ireland; rare; fl. July–Aug.—*Rootstock* creeping. *Stems* floating, leafy. *Leaves* 1–2 in., in close-set whorls; segments distant, capillary, collapsing when removed from the water. *Spike* elongate. *Flowers* white. *Anthers* linear. *Fruit* sub-globose, green, rounded on the back.—DISTRIB. Europe, N. Africa, Siberia to Dahuria, W. Asia to India, E. and W. N. America.

VAR. *pectina'tum*, DC. (sp.); floral leaves hardly longer than the flowers.

2. **M. alterniflo'rum,** *DC.*; spike curved at the tip in bud, female floral leaves whorled in threes or fours pectinate longer than the flowers, male opposite or alternate entire or serrate shorter than the flowers.

Ponds and ditches; ascending to 1,200 ft. in the Highlands; fl. June–Aug. —Habit of *M. spicatum*, L.; but more slender and flowers fewer, and inhabits lakes in hilly and upland districts.—DISTRIB. Europe (Arctic), N. Africa, Arctic America.

3. **M. spica'tum,** *L.*; spike erect in bud, floral leaves all whorled in about fours pectinate shorter than the flowers.

Ponds and ditches, ascending to 1,200 ft. in the Highlands; fl. June–Aug.—The small floral leaves, giving the inflorescence a more spicate appearance than *M. verticillatum*, is its best character; the fruit also is less globose.—DISTRIB. Europe (Arctic), N. Africa, Siberia, N. America.

3. CALLITRICHE, *L.* WATER STAR-WORT.

Slender glabrous marsh or aquatic plants. *Leaves* opposite, quite entire, upper often rosulate. *Flowers* monœcious, minute, solitary, axillary.—MALE fl. *Stamen* 1, subtended by two bracts, filaments slender; anther-cells confluent above.—FEMALE fl. *Bracts* 2 or 0. *Ovary* sessile or shortly pedunculed, 4-lobed longitudinally, 4-celled; styles 2, slender, stigmatose all over. *Fruit* compressed, indehiscent, 4-lobed, 4-celled, lobes margined or winged at the back, at length separating.—DISTRIB. Chiefly temp. waters; species 3 or 4.—ETYM. *καλός* and *θρίξ*, from the elegance of its *capillary* ramification.—I have followed Hegelmaier's limitation of the British forms of this very variable genus. Its affinities are doubtful.

1. **C. ver'na,** *L.*; leaves not dilated at the base, flowers bracteate, carpels slightly keeled connate for about half their breadth.

Ponds, ditches and sluggish streams, ascending to 2,200 ft. in the Highlands; fl. April–Oct.—Very variable in size and habit, covered with scattered stellate hairs or scales. *Stems* 3–12 in., submerged, terete, sparingly branched. *Leaves* ½–1 in., submerged linear; floating rosulate, obovate, notched, 3-nerved. *Flowers,* male and female often in opposite axils. *Bracts* white, deciduous, incurved. *Filaments* very slender. *Furrow* on the carpels shallow, not extending to the base of the lobes.—DISTRIB. All temp. and cold climates (Arctic).

Sub-sp. VERNA'LIS, *Kuetzing* (sp.); fruit sessile, carpels turgid sharply keeled sinus shallow, styles erect or spreading, pollen ellipsoid. *C. aquatica,* Sm.

Sub-sp. PLATYCAR'PA, *Kuetzing* (sp.); fruit subsessile, carpels flattish sharply keeled sinus deep, styles at length reflexed persistent, pollen subglobose.

Sub-sp. HAMULA'TA, *Kuetzing* (sp.); fruit subsessile, carpels flattish shortly broadly keeled sinus shallow, styles long at length reflexed deciduous, pollen subglobose.

Sub-sp. PEDUNCULA'TA, *DC.* (sp.), leaves always linear, fruit peduncled or sessile, carpels flattish shortly sharply keeled sinus shallow, styles long at length reflexed deciduous, pollen subglobose.—Flowers earlier.

2. **C. autumna'lis,** *L.*; leaves dilated at the base, bracts 0, carpels broadly winged connate at the base only.

Lakes, rare and local; Isla and Kincardine to Anglesea; N. and N.W. Ireland; fl. June–Oct.—*Stem* brittle and leaves without stellate hairs. *Leaves* ½–¾ in., all linear, dark green. *Fruit* much larger than in *C. verna.*—DISTRIB. Europe (Arctic), Siberia, N. America.

ORDER XXXII. ONAGRA'RIEÆ.

Herbs (rarely shrubs or trees). *Leaves* opposite or alternate, exstipulate. *Flowers* usually axillary, regular. *Calyx* superior; lobes 2–4, valvate in bud. *Petals* 2–4, rarely 0, inserted at the base of the disk, fugacious, twisted in bud. *Stamens* 1–8, 1–2-seriate, sometimes declinate; anthers oblong. *Disk* epigynous and coating the calyx-tube. *Ovary* 4- (rarely 1–6-) celled; style filiform, stigma entire or 4-lobed; ovules 1 or more in the inner angle of each cell, pendulous or ascending, anatropous. *Fruit* a drupe, berry, or capsule. *Seeds* 1 or more, smooth papillose or hairy, albumen 0 or very scanty; embryo ovoid, cotyledons plano-convex.—DISTRIB. Temp. regions, rarer in tropical; genera 22; species 300.—AFFINITIES. With *Lythraceæ* and *Melastomaceæ,* but not strong.—PROPERTIES unimportant.

Petals 4, pink or purple. Stamens 8.....1. Epilobium.
Petals short or 0. Stamens 4.....2. Ludwigia.
Petals 4, yellow. Stamens 8.....2*. *Œnothera.*
Petals 2, white. Stamens 2.....3. Circæa.

1. EPILO'BIUM, *L.* WILLOW-HERB.

Herbs or under-shrubs, stolons creeping. *Leaves* alternate or opposite. *Flowers* solitary axillary, or in terminal leafy spikes, pink or purple, rarely yellow. *Calyx-tube* slender; limb 4-partite, deciduous. *Petals* 4, usually 2-lobed. *Stamens* 8, the alternate shorter. *Ovary* 4-celled; style filiform,

stigma obliquely clavate or 4-lobed; ovules many, 2-seriate, ascending. *Capsule* elongate, 4-celled, loculicidally 4-valved; valves separating from a 4-winged seed-bearing axis. *Seeds* broadest above, tipped with a long pencil of hairs, minutely tubercled.—DISTRIB. Arctic, temp. and cold regions, abundant in New Zealand; species 50.—ETYM. ἐπί and λόβον, from the position of the corolla, &c. on the pod.

SECTION 1. **Chamæne'rion.** *Corolla* irregular, rotate. *Calyx-lobes* free to the base, spreading. *Stamens* declinate.

1. **E. angustifo'lium,** *L.*; stem tall simple, leaves lanceolate. *Rose-bay* or *French Willow.*

Moist river-sides and copses, most common in Scotland; ascending to 2,700 ft. in the Highlands; E. and N. of Ireland, rare; fl. July–Aug.—Glabrous, inflorescence pubescent. *Stem* 2–4 ft., erect, terete. *Leaves* 3–6 in., petioled, alternate, obscurely toothed, glaucous below. *Racemes* elongate. *Flowers* 1 in. diam., bracteate, dark rose-purple. *Petals* obovate-spathulate, 2 lower smaller. *Style* bent down, stigmas 4, erect then revolute. *Capsule* 2–4 in. *Seeds* obovoid.—DISTRIB. Temp and Arctic Europe, N. and W. Asia to the Himalaya, and America.

VAR. *brachycar'pum,* Leighton (sp.); stem 4–6 ft., buds very oblique, capsules 1–1½ in.—Only known in cultivation and as a garden escape.

SECTION 2. **Lysima'chion.** *Flowers* regular, campanulate or funnel-shaped. *Calyx-lobes* connate at the base. *Stamens* erect.

* *Stem terete. Stigma* 4-*cleft.*

2. **E. hirsu'tum,** *L.*; glandular-pubescent and hirsute, leaves opposite oblong-lanceolate ½-amplexicaul serrulate, buds erect. *Codlins-and-cream.*

Sides of ditches and rivers, from Aberdeen southwards; fl. July–Aug.—Odorous. *Stolons* subterranean, thick, fleshy, scaly, leafless. *Stems* 3–5 ft., terete with raised lines from the leaf-bases. *Leaves* 3–5 in., teeth incurved. *Flowers* very many, ½–¾ in. diam., rose-purple. *Petals* broad, notched. *Filaments* bearded at the base. *Stigma-lobes* revolute. *Capsule* 2–3 in.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in N. America.

3. **E. parviflor'um,** *Schreb.*; pubescent or glabrate, leaves mostly alternate sessile lanceolate obscurely toothed, buds erect.

Ditches and river-banks, from Moray and the Hebrides southwards; fl. July–Aug.—*Stolons* autumnal, with subsessile rosulate leaves. *Stem* 1–3 ft., terete, branched above. *Leaves* 1–2 in., linear or oblong-lanceolate, rounded at the base. *Flowers* ½ in. diam., many, rose-purple. *Stigma-lobes* short, not revolute. *Capsules* 1½–2 in., pubescent.—DISTRIB. Europe, N. Africa, Himalaya.

VAR. 1, *rivula're,* Wahl. (sp.); almost glabrous.—VAR. 2, *interme'dium,* Mérat (sp.); most or all the leaves alternate.

4. **E. monta'num,** *L.*; stem pubescent, leaves mostly opposite glabrous oblong-ovate acute toothed, buds drooping.

Shady banks, walls and cottage roofs, ascending to near 1,700 ft. in the Lake district; fl. June–July.—*Stolons* autumnal, subterranean and fleshy, or subærial with suberect rosulate leaves. *Stem* 6–24 in., erect, subsimple, slender. *Leaves* 1–3 in., sometimes petioled, or whorled in threes. *Flowers* ¼–½ in. diam., pale purple. *Stigma-lobes* short, not revolute. *Capsules* 2–3½

in., finely pubescent.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya.

5. **E. lanceola'tum,** *Sebast.* and *Maur.*; finely pubescent, leaves mostly alternate petioled oblong-lanceolate toothed, buds inclined.

Roadsides and stony places by streams, Devonshire, Somerset, Monmouth, Derbyshire; fl. July–Oct.—*Stolons* autumnal, with spreading rosulate leaves. *Stem* 1–3 ft., erect, branched, terete, pubescent, hairs short recurved. *Leaves* 1½–3 in., lowest opposite, petioles terminating in obscure decurrent lines on the stem. *Flowers* ½ in. diam., many, pale rose. *Stigma-lobes* short, spreading. *Pods* 2–3 in., finely pubescent.—DISTRIB. Europe from the Channel southwards, and eastwards to Turkey.

** *Stem often more or less 2–4 angled, or with 2–4 raised lines. Stigma oblique, clavate.*

6. **E. ro'seum,** *Schreb.*; pubescent above with 2–4 raised lines, leaves petioled mostly alternate ovate-oblong narrowed above and below toothed glabrous, buds inclined acuminate.

Copses and moist places from Mid. Scotland southwards, rare in the north; a doubtful native of Ireland; fl. July–Aug.—*Stolons* autumnal, with loosely rosulate leaves. *Stem* 1–2½ ft., erect, brittle, much branched. *Leaves* 1½–2½ in. *Flowers* many, 6 in. diam., rose-red. *Capsules* 2–3 in., pubescent. —DISTRIB. Europe, Siberia, Himalaya, N.W. America.

7. **E. tetrag'onum,** *L.*; pubescent above, stem 2–4-angled, leaves sessile oblong- or ovate- or linear-lanceolate toothed, buds erect acute.

Wet places, ascending to 2,100 ft. in the Highlands; fl. July–Aug.—*Stem* 1–2 ft., erect, branched, rather tough. *Leaves* 1–3 in., narrow, lower or all below the branches opposite, rarely slightly petioled, base decurrent. *Flowers* ¼–⅓ in., rose-lilac. *Pods* 2–4 in.—DISTRIB. Europe (Arctic), N. and S. temp. and colder zones.

Sub-sp. TETRAG'ONUM proper; stolons autumnal with rosulate leaves, leaves linear-oblong or -lanceolate shining above, capsules 2–4 in. slightly incurved.

Sub-sp. OBSCU'RUM, *Schreb.* (sp.); stolons æstival with few distant pairs of opposite leaves, leaves ovate-lanceolate not shining above, capsules 1–2 in. suberect or rather spreading. *E. virgatum,* Gren. and Godr.—The most common form.

8. **E. palus'tre,** *L.*; finely pubescent above, stem terete without raised lines, leaves subsessile mostly opposite lanceolate from a cuneate base, buds nodding obtuse, seed fusiform, testa produced at the tip.

Bogs and ditches; ascending to near 2,000 ft. in Yorkshire; fl. July–Aug.—*Stolons* æstival, subterranean, filiform, scaly, bearing in autumn scaly buds. *Stem* 6–24 in., simple or branched, with often two lines of pubescence. *Leaves* 1½–2½ in., flaccid, spreading, almost all opposite, scarcely toothed, tip narrowed but obtuse. *Flowers* horizontal, ⅛ in. diam., rose-lilac. *Pods* 2–2½ in. *Seeds* much narrower than in all preceding species, with a distinctly produced testa.—DISTRIB. Temp. and Arctic zones of the N. hemisphere.

VAR. *ligula'tum,* Baker; leaves lanceolate faintly toothed, seeds shorter.

9. **E. alsinifo'lium,** *Villars;* almost glabrous, stems tufted ascending with 2–4 obscure pubescent lines, leaves usually opposite subsessile ovate or ovate-lanceolate acuminate toothed glabrous shining, buds drooping obtuse, seeds narrow clavate, testa produced at the tip.

Spongy rills, &c. in alpine and subalpine districts, Wales, N. of England, and Scotland, ascending to near 2,900 ft.; absent from Ireland; fl. July.—*Stolons* æstival, subterranean, filiform, scaly, bearing in autumn a scaly bud. *Stem* 4–12 in., simple or branched, flexuous, subsucculent. *Leaves* 1–2 in., like those of *E. montanum*, flaccid, bright green. *Flowers* ¼ in. diam., few, bright rose-purple. *Capsule* 1½–2 in., almost glabrous.—DISTRIB. Arctic, Northern and Mts. of Mid. Europe, E. and W. N. America.

10. **E. alpi'num,** *L.*; small, slightly pubescent, stem with 2 pubescent lines, leaves opposite elliptic-oblong obtuse entire or toothed, buds obtuse and flowers pendulous, seeds narrow-obovoid, testa not produced.

Alpine rills, of Scotland only, ascending to near 4,000 ft.; fl. July.—*Stolons* rosulate, æstival. *Stem* usually ascending, 3–9 in., slender, simple, often curved. *Leaves* ½–¾ in., few, shortly petioled. *Flowers* 1–3, ½–⅓ in. diam., bright or pale rose-purple. *Capsules* 1–1½ in., almost glabrous.—DISTRIB. Arctic and Alpine Europe, Asia, the Himalaya, N. America.

VAR. *anagallidifo'lium*, Lamk. (sp.); stolons elongate with opposite pairs of green-leaves, flowers small pale.—The commonest form.

2. LUDWIG'IA, *L.*

Annual or perennial herbs, sometimes aquatic. *Leaves* opposite or alternate, quite entire. *Flowers* usually axillary solitary and sessile; peduncles 2-bracteate. *Calyx-tube* cylindric or angled or turbinate; lobes 3–5, persistent. *Petals* 3–5 or 0, and stamens (3–5) inserted under the margin of an epigynous disk. *Ovary* 4–5-celled; style short, stigma 3–5-lobed; ovules many, in many series, on prominent axile placentas. *Capsule* septicidal or dehiscing by terminal pores, or irregularly rupturing longitudinally. *Seeds* minute.—DISTRIB. Temp. and warm regions, chiefly of N. America; species 20.—ETYM. C. G. Ludwig, a Leipsic botanical professor.

1. **L. palus'tris,** *Elliot*; leaves all opposite ovate or elliptic. *Isnar'dia*, L.

Boggy pools, Buxted, Sussex; Petersfield Heath and Brockenhurst, Hants; Jersey; fl. June–July.—Glabrous, perennial. *Stem* 6–10 in., rooting at the nodes, procumbent or floating, 4-angled, branched. *Leaves* ½–1 in., petioled, acute, shining. *Flowers* 4-merous, minute, axillary, sessile, green; bracts subulate. *Calyx-tube* ⅛ in., oblong, truncate, with 4 green ribs; lobes triangular, acute. *Petals* 0 (or small and red in American specimens). *Style* short, stigma large capitate. *Seeds* angular.—DISTRIB. Europe from Hamburg southwards, N. Africa, Mid. Asia, E. and W. N. America.

2*. *ŒNOTH'ERA*, *L.* EVENING PRIMROSE.

Herbs, rarely shrubby. *Leaves* alternate. *Flowers* axillary, solitary or in leafy spikes or racemes, large, yellow red or purple. *Calyx-tube* elongate, 4-angled; limb cylindric, 4-lobed, deciduous. *Petals* 4. *Stamens* 8; anthers usually long. *Ovary* 4-celled; style filiform, stigma capitate entire or 4-lobed; ovules many, 1–2-seriate, horizontal or ascending. *Capsule* 4- rarely 1-celled, splitting from the top downwards into 4 septiferous valves, usually leaving the seeds on the axis, sometimes indehiscent. *Seeds* many or few, sometimes appendaged.—DISTRIB. Temp. N. and S. America, rarely tropical; one is Tasmanian; species 100.—ETYM. obscure.

Œ. BIEN'NIS, *L.*; erect, petals obcordate, pods oblong subcylindric.

Cultivated ground at Crosby, Liverpool; a garden escape; fl. July–Sept.—Annual or biennial, pubescent or hairy, 2–3 ft. *Leaves* 3–6 in., ovate-lanceolate, remotely toothed; petiole short, midrib stout, white. *Flowers* 3–3½ in. diam., subspicate, sessile, golden yellow. *Calyx-lobes* much longer than the ovary. *Capsule* 1–2 in., obtusely 4-ribbed.—DISTRIB. N. America.

3. CIRCÆ'A, *Tourn.* ENCHANTER'S NIGHTSHADE.

Slender erect herbs, with creeping rootstocks. *Stem* simple. *Leaves* opposite, petioled, toothed. *Flowers* small, white, in terminal and lateral pedunculed racemes. *Calyx-tube* ovoid; limb 2-parted, reflexed, deciduous. *Petals* obcordate and stamens 2, inserted under the margin of an epigynous disk. *Ovary* 1–2-celled; style filiform, stigma capitate 2-lobed; ovules 1 in each cell, ascending, placentas axile. *Fruit* ovoid or pyriform, 1–2-celled, indehiscent, covered with hooked bristles, cells 1-seeded. *Seed* oblong, attached by the middle.—DISTRIB. Europe, temp. Asia, and N. America; species 2 or 3.—ETYM. *Circe*, the enchantress.

1. **C. lutetia'na,** *L.*; glandular-pubescent, leaves ovate faintly toothed not shining, fruit broadly obovoid 2-seeded.

Damp woods, common; ascends to 1,200 ft. in Yorkshire; fl. June–Aug.—*Rootstock* creeping. *Stem* 1–2 ft., erect or ascending, terete, subsimple; nodes swollen. *Leaves* 1–3 in., petioles almost as long, covered with translucent dots, rounded truncate or cordate at the base. *Flowers* ⅛ in. diam., in lax erect terminal racemes, white or pink; pedicels ½ in., slender, patent, reflexed in fruit; bracts usually 0. *Disk* tumid. *Fruit* ⅛ in.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to the Himalaya, temp. America.

2. **C. alpi'na,** *L.*; smaller, less hairy, leaves shining more deeply toothed, ovary less hispid, fruit 1-seeded.

Hilly districts from York northwards, ascending to 1,300 ft. in the Lake district; W. and N.W. of Ireland; fl. July–Aug.—Scarcely entitled to specific rank, though usually a well-marked plant all round the globe; comparatively stouter, 6–8 in.; leaves longer petioled; pedicels with minute subulate bracts.—Hybrids or intermediate varieties are designated as *C. lutetia'na*, var. *interme'dia*, and *C. alpi'na*, var. *interme'dia*, Ehr. (sp.) according to their affinities with one or the other parent.—DISTRIB. as *C. lutetiana*, omitting N. Africa, and extending to within the Arctic circle.

ORDER XXXIII. **LYTHRA'CEÆ.**

Herbs, shrubs (or trees), branches usually 4-angled. *Leaves* opposite or whorled, quite entire, exstipulate. *Flowers* regular or irregular. *Calyx* inferior, tubular or campanulate, persistent; lobes 3–6, valvate in bud, with as many alternating projecting lobes or teeth. *Petals* 3–6 rarely 0, inserted in the calyx-tube, membranous, crumpled in bud. *Stamens* usually definite, inserted in 1–3 series in the calyx-tube, sometimes trimorphic, equal or unequal, inflexed in bud; anthers versatile, often recurved. *Disk* annular or 0, sometimes glandular and unilateral. *Ovary*, sessile or stipitate, 2–6-celled; style straight or flexuous, stigma capitate; ovules many, on the inner angles of the cells, anatropous, horizontal or erect. *Capsule* sur-

rounded by the calyx, 2–6-celled, or 1-celled by the septa vanishing; placentas usually forming a central seed-bearing column. *Seeds* various, albumen scanty or 0; cotyledons oblong or orbicular, 2-auricled.—DISTRIB. Chiefly trop.; genera 30; species 250.—AFFINITIES. With *Onagrariceæ*, *Myrtaceæ*, and *Haloragceæ*.—PROPERTIES. Astringent, acrid, and vesicatory. Pomegranate bark is astringent.

Calyx tubular. Petals exceeding the calyx-teeth ..... 1. Lythrum.
Calyx campanulate. Petals minute or 0 ..... 2. Peplis.

1. LY'THRUM, *L.* LOOSESTRIFE.

Herbs or shrubs, with 4-angled branches. *Leaves* opposite, rarely whorled or alternate, quite entire. *Flowers* axillary, solitary or cymose, red or purple. *Calyx-tube* cylindric, straight; teeth and ribs 8–12. *Petals* 4–6, sometimes unequal or 0. *Stamens* 8–12, 1–2-seriate in the calyx-tube, filaments filiform often declinate. *Ovary* sessile, 2-celled; style filiform, stigma obtuse; ovules very many, placentas thick. *Capsule* 1–2-celled, septicidally 2-valved or bursting irregularly. *Seeds* plano-convex or angular. —DISTRIB. Temp. and trop. regions; species 12.—ETYM. λύθρον, *gore*, from the blood-red flowers.

1. **L. Salicar'ia**, *L.*; leaves opposite or whorled lanceolate cordate at the base, flowers whorled, stamens 12.

River-banks and ditches, &c. from Argyle and Perth southwards; fl. July–Sept. —Glabrous or pubescent. *Rootstock* creeping. *Stem* 2–5 ft., branched, 4–6-angled or winged. *Leaves* 2–5 in., often 3–4 in a whorl, acute. *Cymes* glomerate, in terminal spiked racemes. *Flowers* ¾–1 in. diam., red-purple; bracts small or 0. *Calyx-tube* ¼ in., 12-ribed, outer teeth lanceolate, longer than the inner. *Petals* narrow-oblong, wrinkled. *Capsule* ovoid.—DISTRIB. Temp. N. regions (Arctic), Australia.—Flowers trimorphic in respect of length of style and filaments in 3 sets of individuals. Of those growing by the Thames at Kew, the long-styled is glabrous, slender, with small narrow leaves, and bright flowers; that with very short styles is a larger, coarser, very pubescent plant, with dull purple flower.

2. **L. Hyssopifo'lia**, *L.*; leaves chiefly alternate linear-lanceolate, flowers solitary, stamens about 6.

Moist places, often inundated, very local, Rochester, Oxford, Cambridgeshire, Berkshire, &c.; fl. June–Sept.—Glabrous, annual. *Stem* ½–1½ ft., prostrate or ascending. *Leaves* ½–1 in., sessile, cuneate at the base, very narrow. *Flowers* small, pink. *Calyx-tube* 2-bracteolate; teeth subulate, subequal. *Petals* oblong. *Capsule* cylindric.—DISTRIB. Europe from Hanover southwards, N. and S. Africa, Siberia, India, N. and S. America.

2. PEP'LIS, *L.* WATER-PURSLANE.

Small weak annual herbs. *Leaves* alternate and opposite, quite entire. *Flowers* minute, axillary, subsessile, 2-bracteolate. *Calyx* campanulate, 6-lobed, with as many alternate spreading teeth. *Petals* 6, in the throat of the calyx, fugacious, or 0. *Stamens* 6 or 12, in the middle of the calyx-tube. *Ovary* subglobose, membranous, 2-celled; style short, stigma capitate; ovules very many, placentas semicylindric, attached to the septum. *Capsule* 2-celled, 2-valved, or bursting irregularly, many-seeded. *Seeds*

minute, plano-convex.—DISTRIB. Europe, N. Africa, temp. Asia; species 3.—ETYM. *πέπλιον*, the old name for *Portulaca* transferred.

1. **P. Por'tula,** *L.*; leaves obovate obtuse, flowers axillary solitary.

Moist places, ascending to 1,200 ft. in Yorkshire; fl. July–Aug.—Glabrous, branched, tufted. *Stems* 3–8 in., 4-angled, creeping, fragile. *Leaves* ½–1 in., opposite, short-petioled. *Flowers* very minute, in almost all the leaf-axils, purplish. *Calyx* 12-ribbed, hemispheric; teeth triangular. *Petals* minute or 0. *Stamens* 6 or 12. *Capsule* globose.—DISTRIB. Europe, N. Africa.

ORDER XXXIV. CUCURBITA'CEÆ.

Tribe CUCUMERI'NEÆ.

Prostrate or climbing annual or perennial herbs. *Leaves* alternate, exstipulate. *Tendrils* lateral, simple or divided. *Flowers* usually cymose, monœcious or diœcious. *Calyx* superior; limb rotate, campanulate or tubular; lobes 5, valvate in bud. *Petals* 5, inserted on the calyx-limb, free or connate below, valvate or induplicate in bud. *Stamens* 3, inserted on the base or sides of the calyx; filaments and anthers free or connate, the latter adnate to the filaments, bursting outwards, one 1-celled, two 2-celled, cells straight curved or flexuous. *Ovary* inferior, 3-celled; placentas 3, fleshy, projecting to and confluent in the axis of the ovary and thence reflexed to its walls; style simple or divided, stigmas various; ovules 2-seriate, parietal, horizontal, anatropous, buried in pulp. *Berry* 1-celled, many-seeded, filled with pulp. *Seeds* usually flattened, albumen 0, testa coriaceous or crustaceous; embryo flattened, cotyledons plano-convex or foliaceous, radicle short.—DISTRIB. Chiefly Indian and African; genera 47; species 360.—AFFINITIES. With *Passiflorœ*.—The above characters comprise the mass of the Order, which is included in the tribe *Cucumerí'neæ*.—PROPERTIES. Purgative and bitter, but many yield by cultivation esculent fruits.

1. BRYO'NIA, *L.* BRYONY.

Slender climbing perennial herbs. *Leaves* 3–5-angled or -lobed.—MALE fl. in racemed corymbose or fascicled cymes. *Calyx-tube* campanulate, 5-toothed. *Corolla* rotate or campanulate, 5-partite. *Stamens* 3, rarely 5; anthers free or slightly cohering, cells flexuous.—FEMALE fl. solitary or crowded, *calyx* and *corolla* of the male. *Ovary* ovoid or globose; style slender, 3-fid, stigmas simple or 2-lobed. *Berry* spherical, many or few-seeded. *Seeds* tumid or compressed.—DISTRIB. Temp. and trop.; species 12.—ETYM. *βρύω*, to shoot, from the rapid growth of the shoots.

1. **B. dioi'ca,** *L.*; hispid, diœcious, leaves palmately 5-lobed.

Hedges and thickets in England, rare in the North; absent from Scotland and Ireland; fl. May–Sept.—Acrid, fœtid. *Rootstock* of very large fleshy tubers; juice nauseous, milky. *Stems* many, annual, slender, angled, tendrils simple. *Leaves* 3–5 in. diam., petioled, suborbicular, cordate, lobes sinuate. *Cymes* of male corymbose, 3–8 flowered; of fem. umbelled. *Corolla* ½–¾ in. diam., hairy, greenish. *Ovary* smooth, stigmas 2-cleft. *Berry* ¼ in. diam., red, 3–6-seeded.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia.—Root acrid and cathartic.

ORDER XXXV. UMBELLIFERÆ.

Herbs. *Stems* usually fistular, solid at the nodes. *Leaves* alternate, pinnately or 3-nately compound, rarely simple; petioles dilated at the base. *Inflorescence* of usually regular and compound umbels, with an involucre of whorled bracts at the base of the primary rays, and of bracteoles at the secondary; rarely simple or capitate. *Flowers* small, all 2-sexual and similar; or outer in each umbel male, with large unequal petals and longer stamens, inner female or 2-sexual. *Calyx* superior; limb 0 or 5-toothed. *Petals* 5, epigynous, usually obovate or obcordate, tip often inflexed, imbricate, induplicate, or valvate in bud. *Stamens* 5, at the base of the disk; filaments incurved, anthers versatile. *Disk* epigynous, usually of 2 lobes confluent with the bases of the styles, rarely free. *Ovary* 2-celled; styles 2, erect or recurved, stigmas obtuse; ovules 1 in each cell, pendulous, anatropous, raphe ventral, micropyle superior, integuments confluent with the nucleus. *Fruit* of 2 indehiscent, dorsally or laterally compressed carpels, separated by a commissure; carpels each normally 5- or 10-ridged, attached to and often pendulous from an entire or split slender axis (*carpophore*); pericarp often traversed by oil-canals (*vittæ*). *Seed* pendulous, usually adherent to the pericarp, testa membranous, albumen copious dense; embryo minute, next the hilum, cotyledons ovate-oblong or linear, often very unequal.—DISTRIB. Chiefly N. Europe, N. and W. Asia, and N. Africa; rarer in America, S. Africa, Australia, and tropical mountains; genera 152; species 1,300.—AFFINITIES. Intimate with *Araliaceæ* and *Cornceæ*.—PROPERTIES. 1. Poisonous, acrid, watery sap in *Æthusa, Conium, Cicuta, Œnanthe.* 2. Esculent in *Angelica, Samphire, Parsley, Celery,* &c. 3. Sugar and starch abound in *Carrot, Parsnip, Pig-nut.* 4. Milky fœtid gum-resins in stems of *Asafœtida, Galbanum,* &c. 5. Essential oils in the fruit of *Anise, Dill, Caraway, Coriander,* and *Cummin.*—The ridges are normally 9 on each carpel; viz. 5 primary, of which 2 are lateral next the commissure, 1 dorsal, 2 intermediate; and 4 secondary, alternating with them. The vittæ occur between the ridges, rarely in them; normally there are 6 in each carpel, 4 between the primary ridges and 2 on the commissural face.

SERIES 1. HETEROSCIA'DEÆ. *Umbels simple, or very irregularly compound, or flowers capitate. Vittæ 0 or obscure.* See 34. *Caucalis.*

TRIBE I. **HYDROCOT'YLEÆ.** *Fruit* laterally much compressed; commissure narrow.....1. Hydrocotyle.

TRIBE II. **SANIC'ULEÆ.** *Fruit* subterete, or dorsally compressed; commissure broad.

Leaves spinous. Umbels densely capitate. .....2. Eryngium.
Leaves palmate. Bracts very large.....2*. *Astrantia.*
Leaves palmate. Fruit with hooked spines .....3. Sanicula.

SERIES 2. HAPLOZYG'IEÆ. *Umbels compound. Primary ridges the most conspicuous (except in 22*. Coriandrum). Vittæ usually obvious.*

TRIBE III. **AMMI'NEÆ.** *Fruit* laterally compressed; commissure narrow.

Section 1. **Smyrn'ieæ.** *Fruit short, ovoid or didymous; ridges not winged. Seed grooved in front.*

Vittæ solitary in the interstices; ridges slender.....4. Physospermum.

Vittæ several. Disk-lobes depressed ; ridges elevated .....5. Conium.
Vittæ several. Disk-lobes conical.....6. Smyrnium.

Section 2. **Ammi'neæ** proper. *Fruit as in* 1, *but seed flat in front.*
* Petals entire, tip acute or shortly inflexed. Vittæ 1–2.
Leaves simple. Flowers yellow .....7. Bupleurum.
Leaves compound. Flowers white, diœcious.....8. Trinia.
Leaves compound. Flowers white, 2-sexual .....9. Apium.
** Petals 2-lobed, tip long, inflexed. Vittæ solitary in the interstices.
Calyx-teeth obsolete. Vittæ as long as the fruit .....10. Carum.
Calyx-teeth obsolete. Vittæ very short.....11. Sison.
Calyx-teeth ovate, acute. Vittæ long .....12. Cicuta.
*** Petals as in * ; but vittæ several in each interstice (except in *Ægopodium*).
Calyx-teeth acute. Leaves pinnate.....13. Sium.
Calyx-teeth obsolete. Leaves 2-ternate. Vittæ 0.....14. Ægopodium.
Calyx-teeth obsolete. Leaves various. Vittæ many .....15. Pimpinella.

Section 3. **Scandici'neæ.** *Fruit elongate. Seed grooved in front.*
* Vittæ many in each interstice, often faint .....16. Conopodium.
** Vittæ 0, or 1 in each interstice.
Fruit ¼ in.; ridges almost winged .....17. Myrrhis.
Fruit 1–3 in.; ridges prominent .....18. Scandix.
Fruit ¼ in. ; ridges vanishing upwards .....19. Chærophyllum.
Fruit ⅛–⅓ in. ; ridges 0 or obscure.....20. Anthriscus.

Tribe IV. **SESELI'NEÆ.** *Fruit* globose or ovoid, not laterally compressed; commissure broad ; lateral ridges distinct (except in 22*. *Coriandrum*), rarely winged, if so wings of opposite carpels not in contact.

Sub-tribe 1. **Seseli'neæ** proper. *Fruit subterete ; ridges not thickened or corky.*
Calyx-teeth small. Petals white, notched .....21. Seseli.
Calyx-teeth obsolete. Petals yellow, entire .....22. Fœniculum.

Sub-tribe 2. **Corian'dreæ.** *Fruit globose ; ridges low, secondary broadest.*
22*. *Coriandrum.*

Sub-tribe 3. **Cachry'deæ.** *Fruit subterete ; primary ridges acute ; outer coat of pericarp lax* .....23. Crithmum.

Sub-tribe 4. **Œnan'theæ.** *Fruit subterete ; primary ridges thick, lateral forming a corky rim round the carpel.*
Bracteoles whorled .....24. Œnanthe.
Bracteoles unilateral .....25. Æthusa.

Sub-tribe 5. **Schultz'ieæ.** *Fruit subterete ; lateral ridges thickened or winged* .....26. Silaus.

Sub-tribe 6. **Seli'neæ.** *Fruit dorsally compressed ; primary ridges broad thick.*
Seed concave in front .....27. Meum.
Seed almost flat in front .....28. Ligusticum.

Sub-tribe 7. **Angel'iceæ.** *Fruit much dorsally compressed ; lateral ridges broadly winged* .....29. Angelica.

Tribe V. **PEUCEDA'NEÆ.** *Fruit* much dorsally compressed ; lateral ridges broadly winged, those of the opposite carpels contiguous (face to face) ; other ridges filiform. *Styles* short, stout, erect.
Wings with thin margins ; vittæ as long as the fruit.....30. Peucedanum.
Wings with thin margins ; vittæ club-shaped.....31. Heracleum.
Wings with thick margins .....32. Tordylium.

SERIES 3. DIPLOZYGIEÆ. *Umbels compound (sometimes simple in Caucalis); secondary ridges more distinct than the primary* (see also 22*. *Coriandrum*), *spinous in the British genera.*
Bracts pinnatifid or laciniate. Seed flat in front .....33. Daucus.
Bracts entire or 0. Seed grooved in front .....34. Caucalis.

ARTIFICIAL KEY TO THE GENERA.

I. Leaves undivided.
Creeping. Leaves peltate .....1. Hydrocotyle.
Erect. Leaves linear.....7. Bupleurum.

II. Leaves palmate, or simply 3-nately divided.
Umbels subglobose. Fruit prickly. Leaves palmate .....3. Sanicula.
Umbels in dense heads. Fruit scaly. Leaves spiny .....2. Eryngium.
Umbels many-rayed. Leaves 3-foliolate .....30. Peucedanum.
Bracts large, coloured. Leaves palmate .....2*. *Astrantia.*

III. Leaves simply pinnate, rarely compound at the base.
α. Fruit dorsally much compressed, winged.
Border of wings very thick. Petals pink.....32. Tordylium.
Border of wings not thickened. Petals white .....31. Heracleum.
β. Fruit not much compressed, terete or didymous.
* Fruit spiny. Seed grooved in front..... .....34. Caucalis.
** Fruit glabrous. Seed flat or nearly so in front.
† Petals entire.
Carpophore 2-partite.....10. Carum.
Carpophore entire or 2-fid.....9. Apium.
†† Petals notched or 2-lobed.
Ridges of fruit slender; vittæ clavate, solitary, short.....11. Sison.
Ridges of fruit prominent; vittæ several, long.....15. Pimpinella.
Ridges of fruit slender; vittæ several, long.....13. Sium.

IV. Leaves 2–3- pinnate or 2–3- ternate.
α. Fruit terete or angled, not much dorsally compressed or flattened.
* Seed grooved in front, or with involute margins.
† Fruit muricate or prickly.
Ridges of fruit elevated, with strong spines .....34. Caucalis.
Ridges obscure .....20. Anthriscus.
†† Fruit smooth, glabrous, rarely pubescent.
‡ *Fruit short, ovoid, subglobose or didymous.*
Flowers white. Ridges filiform; vittæ solitary .....4. Physospermum.
Flowers white. Ridges thick, waved; vittæ several .....5. Conium.
Flowers yellow. Ridges stout, even; vittæ several.....6. Smyrnium.
‡‡ *Fruit narrow, but not beaked. Flowers white.*
Ridges slender; vittæ numerous.....16. Conopodium.
Ridges sharp; vittæ 0.....17. Myrrhis.
Ridges obtuse; vittæ solitary .....19. Chærophyllum.
‡‡‡ *Fruit narrow, beaked. Flowers white.*
Beak long; ridges obtuse.....18. Scandix.
Beak moderate; ridges obscure..... .....20. Anthriscus.

** Seed flat in front or nearly so. (Fruit short in all.)

† Petals white, entire, with an incurved point.

Ridges slender; vittæ 1–3. Carpophore entire or 2–fid. ..... 9. Apium.
Ridges stout, sharp; vittæ numerous ..... 23. Crithmum.

†† Petals yellow, entire or with an incurved point.

Ridges slender; carpophore 2-partite ..... 10. Carum.
Dicœcious. Vittæ within the stout ridges ..... 8. Trinia.
Bracteoles 0. Vittæ solitary ..... 22. Fœniculum.
Bracteoles many. Vittæ 2–3 ..... 27. Meum.
Bracteoles many. Vittæ many ..... 26. Silaus.

††† Petals white, obcordate, notched or 2-lobed.

¶ *Calyx-teeth distinct.*

Fruit didymous; ridges flat; vittæ solitary ..... 12. Cicuta.
Fruit subterete; ridges thick; vittæ 1–2 ..... 21. Soseli.
Fruit globose; ridges obscure; vittæ 0 ..... 22*. *Coriandrum.*

¶¶ *Calyx-teeth obscure or* 0.

Fruit covered with hooked bristles ..... 33. Daucus.
Bracts and bracteoles linear ..... 10. Carum.
Bracteoles 0. Ridges slender; vittæ 0; styles slender ... 14. Ægopodium.
Bracts few or 0, bracteoles many. Ridges obtuse ..... 24. Œnanthe.
Bracts and bracteoles unilateral, deflexed ..... 25. Æthusa.
Bracts few or 0, bracteoles many. Ridges almost winged ... 28. Ligusticum.

β. Fruit much dorsally compressed, broadly winged.

* *Lateral wings of the opposite carpels closely contiguous.*

Petals white, notched. Wings thin, vittæ club-shaped ..... 31. Heracleum.
Petals various. Wings thin, vittæ long ..... 30. Peucedanum.
Petals white. Wings with a thickened border ..... 32. Tordylium.

** *Lateral wings of opposite carpels with a space between them.*

Petals white, notched. Wings thin ..... 29. Angelica.

1. HYDROCOT'YLE, *L.* WHITE-ROT, PENNY-WORT.

Small perennial herbs, often creeping. *Leaves* entire, lobed, or 3–5-foliolate. *Umbels* usually simple; bracts few or 0. *Calyx-teeth* 5 or obsolete. *Petals* not inflexed, valvate or imbricate in bud. *Fruit* much laterally compressed; commissure narrow carpophore undivided 2-fid or 0; carpels nearly orbicular, with 1–5 ridges on each side; vittæ 0 or slender; styles filiform, on the flattened disk.—DISTRIB. Temp. and trop.; species 70.—ETYM. *ὕδωρ* and *κοτύλη*, from the *cupped* peltate leaf.

1. **H. vulga'ris,** *L.*; leaves orbicular peltate crenate, petiole pilose.

Marshes, bogs, &c., ascending to 1,000 ft. in the Lake district; fl. May–Aug. —*Stem* filiform, white, creeping, rarely floating. *Leaves* ½–2 in. diam., 1 or 4 at the nodes; petioles 2–6 in. *Umbels* axillary, shortly pedunculed. *Flowers* small, capitate, pinkish-green; bracts minute, triangular, concave. *Fruit* ⅛ in. diam.; carpels covered with resinous points, with 2 ridges on each side.—DISTRIB. Europe, N. Africa.

2. ERYN'GIUM, *L.* ERYNGO.

Rigid, branched, often glaucous, perennial herbs. *Leaves* spinous-toothed, lobed or cut. *Flowers* sessile, in very dense bracteolate heads, surrounded at the base by a whorl of rigid bracts. *Calyx-tube* scaly; teeth rigid,

acute, longer than the petals. *Petals* narrow, deeply notched, point long, inflexed. *Disk-lobes* concave, crenulate. *Fruit* ovoid; commissure broad, carpophore 0; carpels ½-terete, primary ridges obscure 1-vittate; styles filiform, slender, erect. *Seeds* flat or subconcave in front.—DISTRIB. Temp. and sub-trop. regions, chiefly S. American; species 100.—ETYM. uncertain.—Very slender vittæ often occur in the endocarp.

1. **E. marit'imum,** *L.*; very glaucous, radical leaves suborbicular 3-lobed spinous, cauline palmate. *Sea Holly.*

Sandy shores, from Aberdeen and Argyle southwards, all Ireland; fl. July–Aug.—*Rootstock* creeping, stoloniferous. *Stems* 1–2 ft., stout, 3-chotomously branched. *Radical leaves* 2–5 in. diam., margins cartilaginous. *Heads* about 3 together, ½–1 in. diam., at length ovoid. *Primary involucre* of 3 bracts; partial of 5–7 ovate spinous-serrate bracts; bracteoles 3-fid, equalling the flowers. *Flowers* ⅛ in. diam., bluish-white.—DISTRIB. Europe, N. Africa.—Roots formerly candied as a sweetmeat.

E. CAMPES'TRE, *L.*; pale green, radical leaves pinnately 3–5-foliolate, cauline 2-pinnatifid.

Near ballast heaps, Plymouth, Weston-super-Mare, the Tyne, Cardiff, Waterford, &c.; partially naturalized; a denizen, *Watson;* fl. July–Aug.—Erect, 1–2 ft., less glaucous and more branched than *E. maritimum.*—DISTRIB. Europe, from Denmark southwards; N. Africa, W. Siberia.

2*. *ASTRAN'TIA, L.*

Erect, simple or branched, perennial herbs. *Rootstock* short, creeping. *Leaves* palmately lobed or cut. *Umbels* simple or irregularly compound; bracts many, radiating, often coloured. *Flowers* polygamous, males on shorter pedicels. *Calyx-limb* campanulate; teeth exceeding the petals, with long points. *Petals* notched; point long, inflexed. *Disk-lobes* cup-shaped. *Fruit* ovoid or oblong, nearly terete; commissure broad, carpophore 0; carpels dorsally compressed, primary ridges equal, with plaited wrinkled or toothed inflated ribs, interstices 1-vittate; styles filiform.—DISTRIB. Europe and W. Asia; species 4 or 5.—ETYM. ἄστρον, from the *star*-like umbels.

A. MA'JOR, *L.*; leaves with 3–7 ovate-lanceolate serrate lobes.

Naturalized in woods, Ludlow and Malvern; fl. June–July.—*Stem* 1–2 ft. *Radical leaves* 3–4 in. diam., acute, serratures bristle-pointed; petiole 4–10 in. *Bracts* ½–¾ in., ovate-lanceolate, reticulate, white below, above dark green tinged with pink, serrulate. *Flowers* white or pink; pedicels filiform. *Fruit* ⅛ in.; styles spreading.—DISTRIB. Mid. and S. Europe.

3. SANIC'ULA, *L.* SANICLE.

Slender, erect, perennial herbs. *Rootstock* stout, short, creeping. *Leaves* palmately cut. *Umbels* small, subglobose, irregularly compound; bracts leafy; bracteoles few. *Flowers* usually 1-sexual. *Calyx-teeth* as long as the petals, subherbaceous, pungent. *Petals* minute, deeply notched; point long, inflexed. *Disk-lobes* dilated. *Fruit* ovoid; covered with hooked prickles; commissure rather broad, carpophore 0; carpels ½-terete, ridges inconspicuous, interstices 1-vittate; styles filiform. *Seed* flat in front.—DISTRIB. N. temp. regions; species 10.—ETYM. *sano,* to heal.

1. **S. europæ'a,** *L.*; fertile flowers subsessile, males pedicelled.

Copses, &c.; ascending upwards of 1,000 ft. in the N. of England; fl. June–July.—Glabrous. *Stem* 1–2 ft., simple, almost leafless. *Radical leaves* 1–3 in. diam., long-petioled, suborbicular, 3–5-lobed or -partite; lobes cuneate, cut, acutely serrate. *Umbel* ½–¾ in. diam., irregular, rays few; bracts 2–5, unequal, simple or pinnatifid, serrate. *Flowers* pink or white. *Fruit* ⅛ in.; styles spreading.—DISTRIB. Europe, N. and Mts. of trop. Africa.

4. PHYSOSPER'MUM, *Cusson.* BLADDER-SEED.

Erect, herbs, perennial; root fusiform. *Leaves* 3-nately compound, segments cuneate. *Umbels* compound; bracts and bracteoles few, linear; flowers white. *Calyx-teeth* small or 0. *Petals* with a long inflexed point. *Disk-lobes* conical. *Fruit* didymous, bladdery, broader than long; commissure narrow, carpophore simple; carpels terete, smooth, primary ridges slender, interstices 1-vittate. *Seed* loose, concave in front.—DISTRIB. Europe, W. Asia; species 2 or 3.—ETYM. φύσα and σπέρμα, from the *bladdery fruits.*

1. **P. cornubien'se,** *DC.*; branches panicled, umbels long-peduncled.

Thickets, Tavistock, Bodmin (on the Priory lands); fl. July–Aug.—Glabrous; except the puberulous margins and ribs of the leaf. *Stem* 1–2 ft., erect, striate. *Radical leaves* long-petioled, flat, 2–3-ternate; segments ½–¾ in., deeply laciniate, long-petioled. *Umbel-rays* 10–20, 1–3 in., suberect, furrowed.—DISTRIB. S. of France and Spain eastward.

5. CONI'UM, *L.* HEMLOCK.

Tall, glabrous, biennial herbs. *Leaves* pinnately compound. *Umbels* compound, many-rayed; bracts and bracteoles many, small; flowers white, polygamous. *Calyx-teeth* 0. *Petals* obtuse, or the tip shortly inflexed. *Disk-lobes* depressed. *Fruit* broadly ovoid, laterally compressed; commissure constricted, carpophore undivided; carpels 5-angled, primary ridges prominent, obtuse, lateral distinct; vittæ many, slender, irregular; styles short, reflexed. *Seed* deeply grooved in front.—DISTRIB. Europe, Asia, N. Africa; species 2.—ETYM. The old Greek name.

1. **C. macula'tum,** *L.*; stem spotted, leaf-segments pinnatifid.

Banks, roadsides, &c., ascending to near 1,000 ft. in Yorkshire; fl. June–July. —Fœtid. *Stem* 2–5 ft., stout, leafy, furrowed, purple-spotted, paniculately branches above. *Leaves* large, deltoid, finely 2-pinnate; segments ½ in., ovate oblong or deltoid, flaccid, lower petioled, ultimate serrate. *Umbels* terminal and axillary, shortly peduncled; bracts reflexed, short, unilateral; rays 10–20, ½–1 in.; outer flowers rather larger. *Fruit* ⅛ in., greenish-brown.—DISTRIB. Europe, N. Africa, Siberia; introd. in N. America.

6. SMYRN'IUM, *L.* ALEXANDERS.

Stout, erect, glabrous, biennial or perennial herbs. *Radical leaves* 3-nately compound, segments broad. *Umbels* compound; bracts and bracteoles few or 0; flowers yellow, polygamous. *Calyx-teeth* minute or 0. *Petals* with a short inflexed point. *Disk-lobes* conical or depressed. *Fruit* ovoid, laterally compressed or didymous; commissure much constricted, carpophore 2-partite; carpels subterete or angular, with 3 prominent ribs; vittæ many; styles short, recurved. *Seed* deeply grooved in front.

—DISTRIB. Europe, W. Asia, N. Africa; species 6 or 7.—ETYM. The old Greek name.—Ridges variable in prominence and number; outer coat of the pericarp often loose, with the vittæ adhering to the inner.

1. **S. Olusa'trum,** *L.*; cauline leaves petioled 3-foliolate serrate.

Waste places, especially near the sea and amongst ruins, from Stirling southwards, rare; frequent in Ireland; a denizen on the coast, an alien inland, *Watson*; fl. April–June.—Shining. *Root* stout, biennial. *Stem* 1–3 ft., solid, furrowed, panicled, branches often opposite. *Petioles* large, sheathing, margins hairy. *Leaflets* 1½–2 in., broadly obovate or ovate, obtusely serrate or lobed. *Umbels* lateral and terminal, subglobose; rays few or many, long or short. *Fruit* ⅛ in., dark brown.—DISTRIB. Europe from Holland southwards, N. Africa, W. Asia.—Formerly cultivated as a pot-herb.

7. BUPLEU'RUM, *L.* HARE'S-EAR.

Annual or perennial, glabrous herbs or shrubs. *Leaves* simple, quite entire. *Umbels* compound, many-rayed, or irregular and few-rayed; bracts and bracteoles many and leafy, or few and small, or 0; flowers yellow, sessile or pedicelled. *Calyx-teeth* 0. *Petals* hooded, with an inflexed point. *Disk-lobes* tumid or dilated. *Fruit* laterally compressed; commissure broad, carpophore 2-fid; carpels 5-angled, primary ridges prominent or winged or 0; vittæ 0 or 1 or more in the interstices, continuous or interrupted; styles short, reflexed. *Seed* subterete, flat concave or deeply grooved in front.—DISTRIB. Europe, temp. Asia, N. and S. Africa, N.W. America.—ETYM. obscure.

1. **B. rotundifo'lium,** *L.*; annual, stem fistular, leaves perfoliate.

Chalky fields, rare, E. and S. counties, from Durham to Somerset; fl. June–July.—Glaucous. *Stem* 8–18 in., simple or branched above, terete. *Leaves* 1–2½ in., lower oblong, upper suborbicular, apiculate; nerves radiating. *Bracts* 0; bracteoles 3–5, ovate, leafy, longer than the many short rays, connate at the base, suberect in fruit. *Fruit* broad, ⅛ in.; vittæ 0; ridges slender.—DISTRIB. Europe, W. Asia; introd. in N. America.

2. **B. falca'tum,** *L.*; perennial, stem erect slender fistular, leaves oblong-lanceolate, nerves many parallel, upper broader ½-amplexicaul.

Hedgerows and fields, between Ongar and Chelmsford; a doubtful native; fl. Aug.—*Rootstock* branched. *Stems* 1½–4 ft., simple or branched above. *Radical leaves* 1–3 in., acute; petiole ½-amplexicaul; cauline recurved. *Umbels* very small; bracts 2–5, short, unequal; bracteoles 4–5, oblong, aristate. *Flowers* minute. *Fruit* ⅛ in., narrow; ridges prominent; vittæ in threes.—DISTRIB. Europe from Belgium southwards, W. Asia to India and Japan.

3. **B. tenuis'simum,** *L.*; annual, stem solid, leaves linear-lanceolate acuminate 3-nerved, bracts subulate.

Waste places and salt marshes, from Cheshire and Lancashire southwards and westwards to Dorset; fl. Aug.-Sept.—*Stem* 6–18 in., erect or procumbent, flexuous, ribbed. *Leaves* ½–1 in., rigid, lowest slightly dilated upwards. *Umbels* axillary, very small, racemed or subspicate along the branches; bracts 3–5, unequal; bracteoles similar. *Fruit* broad, minute, granulate; ridges prominent; vittæ 0.—DISTRIB. Europe, N. Africa, W. Asia.

4. **B. arista'tum,** *Bartl.*; annual, stem short solid, leaves ensiform pungent 3–5-nerved, bracts oblong aristate. *B. Odontites,* Sm. not of L.

Sandy and rocky banks, &c., very rare; Torquay; E. Sussex; Channel Islands; common; fl. July.—*Stem* 2–8 in., rigid, simple or forked; branches stout, divaricate, ribbed. *Leaves* ½–1 in., lowest sometimes petioled. *Bracts* 3–5, concealing the umbels, rigid; nerves strongly reticulate; margins scarious. *Fruit* minute, oblong; ridges slender, smooth; vittæ solitary.—DISTRIB. Europe from France southwards.

8. TRIN'IA, *Hoffmann.* HONEWORT.

Glabrous, branched herbs. *Leaves* pinnately compound. *Umbels* compound, few-rayed; bracts and bracteoles 1, 2, or 0; flowers white, usually dicœcious, males with narrower petals. *Calyx-teeth* 0 or small. *Petals* acute or with an inflexed point. *Disk-lobes* conical or depressed; margins undulate. *Fruit* broadly ovoid, laterally compressed or didymous; commissure narrow, carpophore 2-partite; carpels subterete or 5-angled, primary ridges subequal, thick, smooth, rugose or plaited, with a large vitta inside each. *Seed* terete.—DISTRIB. S. Europe and temp. Asia; species 8.—ETYM. *Dr. Trinius*, a Russian botanist.

1. **T. vulga'ris,** *DC.*; glabrous, bracts 0 or solitary, ridges smooth.

Limestone rocks, rare; S. Devon, N. Somerset, St. Vincent's Rocks, Bristol; fl. May–June.—Glaucous. *Root* fusiform, biennial, fibrous at the top. *Stem* 3–6 in., branched from the base, solid, stout, deeply grooved; branches divaricate. *Leaves* spreading, petioles and linear segments very slender. *Male umbels* depressed; female irregular, rays longer; bract 3-cleft or 0; bracteoles 2–3, linear. *Flowers* minute. *Fruit* ⅛ in., ovoid; styles slender; segments of carpophore flattened.—DISTRIB. Europe from Belgium southwards to Greece.

9. A'PIUM, *L.* (and *Helosciadium*, Koch). CELERY.

Annual or perennial, glabrous herbs. *Leaves* pinnate or 3-nately compound. *Umbels* compound, often leaf-opposed, or in the forks; bracts few or 0; bracteoles many or 0; flowers white. *Calyx-teeth* 0. *Petals* entire, acute, or with a short incurved point. *Disk-lobes* depressed or conical, margins entire. *Fruit* broadly ovoid, laterally compressed; commissure constricted, carpophore simple; carpels 5-angled, primary ridges equal prominent obtuse; vittæ solitary in the interstices. *Seed* subterete.—DISTRIB. Temp. and subtrop.; species 14.—ETYM. obscure.

SECTION 1. **A'pium** proper. *Bracteoles* 0. *Petals* much incurved.

1. **A. grave'olens,** *L.*; leaves pinnate or 3-foliolate. *Wild Celery.*

Marshy places by the sea, common in England and Ireland, Cantire in Scotland; fl. June–Aug.—Rank-scented. *Root* fusiform, biennial. *Stem* 2 ft., erect, stout, grooved. *Leaves* 6–18 in.; leaflets ½–1½ in., cuneate obovate or rhomboid, lower petioled, cut or lobed. *Umbels* shortly peduncled or sessile. *Flowers* greenish-white. *Fruit* ⅛ in., roundish; ribs prominent; vittæ solitary; styles short, recurved, divergent.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India.

SECTION 2. **Heloscia'dium,** *Koch* (gen.). *Bracteoles* many. *Petals* nearly straight.—Aquatic or subaquatic.

2. **A. nodiflor'um,** *Reich.*; prostrate or creeping, leaves pinnate or 3-foliolate, leaflets slightly lobed serrate.

Marshy places, from Isla and Haddington southwards; fl. July–Aug.— Perennial. *Stems* 1–3 ft., slender. *Leaflets* ½–1½ in., very variable, sessile, oblong, crenate serrate or lobulate. *Umbels* leaf-opposed, sessile or shortly peduncled; rays unequal; bracts usually 0; bracteoles many, oblong, scarious. *Flowers* small. *Fruit* ⅛ in.; ribs prominent; vittæ solitary; styles short, divergent.—DISTRIB. Europe from Belgium southwards, N. Africa.

VAR. 1, *nodiflor'um* proper; stem decumbent, flowering branches rooting at the base only, peduncles short, bracts 0 or 1–2.—VAR. 2, *re'pens*, Koch (sp.); smaller, stem creeping, leaflets sharply toothed, peduncles long, bracts 2–3 unequal unilateral. *Sium repens*, Sm. Rather rare.

3. **A. inunda'tum**, *Reich.*; decumbent or floating, submerged leaves 2–3-pinnate, leaflets capillary rarely linear, floating leaves pinnate, lower leaflets deeply 3-cleft.

Wet places, local; ascending to 1,600 ft. in Yorkshire; fl. June–July.— Perennial, flaccid, small, straggling. *Stem* 4–10 in., stout, flexuous. *Leaflets* of upper leaves ½ in., cuneate, cut or lobed. *Umbels* very small, leaf-opposed, peduncles short, rays 2–4 unequal; bracts 0; bracteoles 4–6, lanceolate, 3-nerved. *Flowers* minute. *Petals* incurved. *Fruit* ⅛ in., subsessile, elliptic-oblong; ridges prominent; vittæ solitary; styles recurved.—DISTRIB. Europe, from Gothland southwards (excl. Spain and Greece).

10. CA'RUM, *L.* CARAWAY.

Annual or perennial, glabrous herbs. *Leaves* pinnate or decompound. *Umbels* compound, few- or many-rayed; bracts few or 0; bracteoles more numerous or 0. *Flowers* white or yellow, 2-sexual or polygamous. *Calyx-teeth* minute or 0, sometimes unequal. *Petals* with an inflexed point and usually very deep notch; of the male flowers often irregular. *Disk-lobes* conical. *Fruit* ovoid or oblong, often hispid, laterally compressed, hardly constricted at the commissure, carpophore 2-fid; carpels 5-angled, primary ridges obtuse, equal, lateral close to the commissure; vittæ 1 (rarely 2) in the interstices. *Seed* ½-terete.—DISTRIB. Temp. and subtrop.; species 50.—ETYM. The old Latin name.

SECTION 1. **Ca'rum** proper. *Root* fusiform or fibrous. *Leaves* 1–2-pinnate. *Calyx-teeth* minute. *Petals* white, deeply notched.

1. **C. verticilla'tum**, *L.*; root of fascicled fibres, leaves linear pinnate, leaflets sessile short whorled palmately multifid, segments capillary.

Meadows in the W. counties, from Argyle and Dumbarton southwards, local; N.E. and W. Ireland; fl. July–Aug.—*Root-fibres* 1–2 in., thickened downwards. *Stem* 1–2 ft., erect, striate. *Radical leaves* 6–12 in., subcylindric; leaflets curved upwards, capillary-multifid. *Umbels* regular, flat-topped; rays 1–2 in., peduncles slender; bracts and bracteoles many, slender, short, reflexed. *Flowers* white or pink. *Fruit* ovoid; ridges strong; vittæ large; styles recurved.—DISTRIB. W. Europe from Holland southwards.

C. CAR'UI, *L.*; root fusiform, leaves narrow triangular- or linear-oblong 2-pinnate, leaflets cut to the base into linear lobes, bracts 1 or 0, bracteoles 0. *Caraway.*

Waste places, naturalized only; fl. June–July.—*Stem* 10–24 in., slender, branched, striate, fistular. *Leaves* 6–10 in.; pinnules opposite, segments acuminate. *Umbels* rather irregular, peduncles slender. *Flowers* white,

outer larger irregular. *Fruit* oblong, ridges short; vittæ conspicuous; styles spreading.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya.

SECTION 2. **Petroseli'num,** *Hoffm.* (gen.). *Root* fusiform. *Leaves* pinnate or 2–3-pinnate. *Calyx-teeth* obsolete. *Petals* white or yellowish, scarcely notched. (Intermediate between *Apium* and *Carum.*)

2. **C. seg'etum,** *Benth.*; leaves pinnate, flowers white. *Corn Parsley.*

Hedgebanks and waste places, local, from Hull southwards; fl. Aug.–Sept.—Glabrous, annual. *Stem* 2–3 ft., erect, branched, terete, striate, solid. *Leaves* 4–6 in., oblong; leaflets ½–1½ in., subsessile, lobed or pinnatifid, segments crenate. *Umbels* small, irregular, rays very unequal, outer ½–1 in.; bracts and bracteoles 3–5, linear or subulate. *Flowers* minute. *Fruit* ⅛ in., ovoid; styles very short, erect.—DISTRIB. Mid. and S. Europe, from Holland southwards; W. Asia.

C. PETROSELI'NUM, *Benth.*; leaves 3-pinnate, flowers yellow. *Petroselinum sativum,* Hoffm. *Common Parsley.*

Castle walls and waste places; a garden escape; fl. June–Aug.—Glabrous, shining, biennial. *Stem* 1–2 ft., erect, much-branched, terete, striate, solid. *Leaves* deltoid; leaflets many, ½–1 in., close-set, broadly ovate, 3-cleft; segments cuneate, crenate, of upper leaves few, narrow. *Umbels* regular, flat-topped; rays many, 1–2 in.; bracts 2–3, often divided; bracteoles many. *Flowers* minute. *Fruit* 1/16 in., ovoid, green; styles slender, reflexed.—DISTRIB. Only known as a cultivated plant or an escape.

SECTION 3. **Bu'nium,** *L.* (gen.). *Root* a solitary tuber. *Leaves* 2–3-pinnate. *Calyx-teeth* minute. *Petals* white, deeply notched.

3. **C. Bulbocast'anum,** *Koch;* leaves broadly triangular 3-pinnate, primary segments petioled, leaflets cut into few slender lobes.

Chalky fields, rare, Hertford, Bedford, and Cambridge; fl. June–July.—*Root* globose, as large as a chestnut, black. *Stem* erect, striate, much branched, and petioles flexuous at the base. *Leaves* 4–6 in., ultimate segments ½–¾ in., tips callous. *Umbels* rather irregular, many-rayed; bracts and bracteoles small, narrow; peduncles stout, grooved, angular. *Flowers* white, outer rather larger. *Fruit* nearly ¼ in.; ridges stout; vittæ compressed; styles short, recurved.—DISTRIB. Europe from Belgium southwards, N. Africa, Siberia.—Pigs are fed on the tubers in Hertfordshire.

11. SI'SON, *L.*

Characters of *Carum,* but vittæ very short, often obscure, occupying only the upper half of the fruit.—DISTRIB. One species, native of Europe, from France southwards and eastwards.—ETYM. unknown.

1. **S. Amo'mum,** *L.*; leaves pinnate or 2-pinnate below, upper smaller 3-lobed toothed or entire.

Moist places, hedgebanks, &c., from York and Chester southwards, rare in the N. of England; a native? *Watson;* fl. Aug.–Sept.—Annual or biennial, glabrous, nauseous-smelling. *Root* fusiform. *Stem* 2–3 ft., erect, branched, slender, leafy, solid. *Leaves* 6–12 in., deltoid-oblong; leaflets 1–3 in., shortly petioled, linear-oblong or ovate, base cuneate. *Umbels* terminal and axillary, compound; rays few, slender, unequal; bracts and bracteoles 2–4, short, subulate, rarely 0. *Flowers* minute, white. *Petals* broadly obcordate, deeply notched, with a long inflexed point. *Fruit* ovoid or subglobose;

ridges strong; vittæ very short, narrowed upwards; styles short, recurved, on thick depressed disk-lobes.—Closely resembles *Carum segetum*.

12. CICU'TA, *L.* WATER-HEMLOCK, COWBANE.

Tall, perennial, glabrous herbs. *Leaves* pinnate or decompound. *Umbels* compound, many-rayed; bracts few or 0; bracteoles many, small; flowers white. *Calyx-teeth* acute. *Petals* with an inflexed point. *Disk-lobes* depressed, entire. *Fruit* orbicular or broadly ovoid, constricted at the commissure, didymous, carpophore 2-partite; carpels slightly compressed, primary ridges thick broad flat; vittæ solitary in the interstices. *Seeds* subterete, slightly convex in front.—DISTRIB. Marshes of the N. hemisphere; species 3.—ETYM. The old Latin name of the Hemlock.

1. **C. viro'sa,** *L.*; root fibrous, leaflets lanceolate doubly serrate.

Watery places, from Dumbarton and Forfarshire southwards. Mid. and N. Ireland, local; fl. July–Aug.—*Rootstock* short, stout, hollow and septate. *Stem* 2–4 ft., stout, leafy, furrowed. *Leaves* large, deltoid, 2–3-pinnate; petioles stout; leaflets 2–4 in., oblique. *Umbels* 3–5 in. diam., long-peduncled, terminal and leaf-opposed, flat-topped, rays long, slender; bracts 0; bracteoles many, short, slender. *Flowers* minute. *Calyx-teeth* ovate. *Fruit* $\frac{1}{10}$ in. broad, broader than long; styles slender, recurved.—DISTRIB. Europe (Arctic), Siberia to Kamtschatka.

13. SI'UM, *L.* WATER-PARSNIP.

Glabrous herbs. *Leaves* pinnate; leaflets toothed. *Umbels* compound, terminal or lateral; bracts and bracteoles many; flowers white. *Calyx-teeth* acute. *Petals* with an inflexed point. *Disk-lobes* thick, conical, or depressed. *Fruit* ovoid or oblong, laterally compressed or constricted at the commissure, carpophore undivided; carpels 5-angled, primary ridges equal, prominent, obtuse or thickened, lateral next the commissure; vittæ many, in the interstices. *Seed* subterete.—DISTRIB. N. temp. regions, S. Africa, St. Helena; species 4.—ETYM. unknown.

1. **S. latifo'lium,** *L.*; leaflets regularly serrate, umbels terminal.

Watery places, common in the Fen counties, rare elsewhere; Falkirk in Scotland; local and rare in Ireland; fl. July–Aug.—*Rootstock* short, stoloniferous. *Stem* 5–6 ft., erect, stout, fistular, grooved, branched above. *Leaves* large; leaflets 4–6, 2–6 in., sessile, linear- or oblong-lanceolate; submerged sometimes pinnatifid. *Umbels* large, flat-topped, rays many; bracts and bracteoles often foliaceous, large. *Flowers* small, outer rather larger. *Fruit* $\frac{1}{8}$ in., broadly ovoid, ridges prominent; styles rather slender.—DISTRIB. Europe (except Turkey), N.W. Asia to India, N.W. America.

2. **S. angustifo'lium,** *L.*; leaflets of radical leaves regularly of stem-leaves very irregularly serrate, umbels leaf-opposed.

Wet places, from Elgin southwards; rarer in Scotland and Ireland; fl. summer. —*Rootstock* creeping stoloniferous, leafing at the nodes. *Leaves* 4–8 in.; leaflets of lower leaves 5–10, 1–2 in., sessile, ovate-oblong; of cauline leaves fewer, smaller. *Stem* 1–3 ft., leafy. *Umbels* with few and unequal rays; bracts irregularly cut. *Fruit* shorter than in *S. latifolium*, with more immersed vittæ and conical disk-lobes.—DISTRIB. Europe, W. Asia to India.

14. ÆGOPO'DIUM, *L.* GOAT-, GOUT-, or BISHOP'S-WEED.

Stem stout, glabrous. *Rootstock* creeping. *Leaves* 2–3-ternate; leaflets broad. *Umbels* compound, many-rayed; bracts and bracteoles few or 0; flowers white. *Calyx-teeth* 0. *Petals* broad; unequal, point inflexed. *Disk-lobes* tumid; styles slender, reflexed. *Fruit* ovoid, laterally compressed, carpophore 2-fid; carpels 5-angled, primary ridges slender equal distant; vittæ 0. *Seed* subterete.—DISTRIB. Europe, excl. Spain, W. Asia.—ETYM. *αἴξ* and *ποῦς*, from the likeness of the leaf to a *goat's foot.*

1. **Æ. Podagra'ria,** *L.*; leaves deltoid. *Herb Gerard.*

Waste places near buildings or gardens, from Elgin southwards; a doubtful native; a denizen in N. Britain, *Watson;* fl. June–Aug.—Glabrous. *Rootstock* white, pungent, aromatic. *Stem* 1–2 ft., fistular, grooved, branched above. *Leaves* 4–5 in., uppermost opposite; leaflets sessile, obliquely lanceolate or ovate-acuminate, irregularly serrate. *Umbels* terminal. *Flowers* small. *Fruit* ⅛ in., narrow-ovoid.

15. PIMPINEL'LA, *L.* BURNET-SAXIFRAGE.

Perennial, rarely annual herbs. *Leaves* pinnate or 3-nately compound. *Umbels* compound; bracts 0 bracteoles few or 0; flowers white or yellow. *Calyx-teeth* small, or 0. *Petals* deeply notched, point long inflexed. *Disk-lobes* thick, conical. *Fruit* ovoid or oblong, laterally compressed, constricted at the broad commissure, carpophore 2-fid; carpels 5-angled, primary ridges equal slender; vittæ many, in the interstices; styles short or long. *Seed* subterete, nearly flat in front, usually free from the pericarp.—DISTRIB. N. temp. regions, S. Africa, rare in S. America; species 70.—ETYM. *bipennula*, from the 2-pinnate leaves.

1. **P. Saxif'raga,** *L.*; stem terete, radical leaves pinnate, leaflets suborbicular, cauline 2-pinnate.

Dry pastures from Sutherland southwards, ascends to 1,800 ft. in Yorkshire; fl. July.—Perennial, glabrous or pubescent. *Rootstock* slender, hot, acrid. *Stem* 1–3 ft., slender, furrowed, branched. *Leaflets* 4–8 pair, very variable, serrate lobed or almost pinnatifid; lobes of cauline much narrower. *Umbels* flat-topped. *Flowers* small, white. *Fruit* ⅛ in., glabrous, broadly ovoid; styles short, reflexed.—DISTRIB. Europe (Arctic), Siberia to Dahuria.

2. **P. mag'na,** *L.*; stem angular, leaves all pinnate, leaflets of radical ovate subcordate, of cauline narrower.

Bushy waste places, local in England, from York and Durham southwards; rare in Ireland; fl. July–Aug.—Much larger than *P. Saxifraga*, but similar, 3–4 ft.; leaflets often 1–2 in., membranous and broad; styles longer and more slender; outer flowers 2-sexual, inner male. — DISTRIB. Chiefly Western and Mid. Europe.

16. CONOPO'DIUM, *Koch.* EARTH-NUT.

Glabrous or pilose herbs. *Rootstock* tuberous. *Leaves* 3-nately divided. *Umbels* compound, many-rayed; bracts and bracteoles 0 or membranous; flowers white, polygamous, outer sometimes radiating. *Calyx-teeth* obsolete. *Petals* of outer flowers often irregular, 2-fid, with an inflexed point. *Disk-lobes* conical or depressed. *Fruit* ovoid or oblong, often shortly beaked; commissure constricted, carpophore 2-fid; carpels subterete, primary

ridges slender; vittæ several in the interstices, often obscure or interrupted. *Seed* deeply grooved in front.—DISTRIB. Europe, N. Africa, temp. Asia; species 8.—ETYM. *κώνος* and *πούς*, from the *conical* disk-lobes.

1. **C. denuda'tum,** *Koch;* leaf-lobes linear, bracts and bracteoles 0. *Bunium flexuosum,* With.

Woods and fields; fl. summer.—Glabrous. *Rootstock* size of a chesnut, brown. *Stem* 2–3 ft., slender, terete, flexuous. *Leaves* 3-ternate, broadly deltoid, on slender petioles; segments pinnatifid, lobes linear, the central largest. *Umbels* terminal, drooping when young, 6–10 rayed; flowers small. *Fruit* ⅛ in., narrow-ovoid, ridges obscure; styles short, erect.—DISTRIB. Western Europe.—Very similar to *Carum Bulbocastanum.*

17. MYR'RHIS, *Scop.* CICELY.

Perennial tomentose herbs. *Leaves* decompound. *Umbels* compound, many-rayed; bracts few or 0; bracteoles many, membranous; flowers white, polygamous. *Calyx-teeth* minute or 0. *Petals* with a very short inflexed point. *Disk-lobes* tumid. *Fruit* much elongate, hardly beaked, commissure broad, carpophore 2-fid; carpels very convex at the back, primary ridges equal, hollow, very often rough, prominent; vittæ in the interstices solitary, slender, or obsolete. *Seed* concave or deeply grooved in front.—DISTRIB. Mts. of Europe and temp. S. America; species 2.—ETYM. The old Greek name.

1. **M. odora'ta,** *Scopoli;* leaves whitish beneath, bracteoles lanceolate.

Mountain pastures, usually near houses, from Chester and Derby northwards to Renfrew; ascending to 1,200 ft. in Yorkshire; not indigenous in Ireland; a denizen or alien, *Watson;* fl. May–June.—Sparingly and finely hairy. *Root* fleshy, fusiform. *Stem* 2–3 ft., leafy, terete, fistular, grooved, branched above. *Leaves* deltoid, 3-pinnate; leaflets pinnatifid, lobes serrate; sheaths large. *Umbels* terminal; bracteoles membranous, awned; flowers small, outer only fertile. *Fruit* ¼ in., linear-oblong, dark brown, ridges often scabrid; styles very slender, diverging.—DISTRIB. Europe from France southwards and eastwards, W. Asia.—Aromatic and stimulant; once cultivated as a pot-herb, still used in salads in Italy.

18. SCAN'DIX, *L.* SHEPHERD'S NEEDLE.

Annual herbs. *Leaves* pinnately decompound; segments small, narrow. *Umbels* simple or compound, bracts 1 or 0; bracteoles several, entire or cut; flowers white, polygamous, outer often radiating. *Calyx-teeth* minute or 0. *Petals* often unequal, point short inflexed or 0. *Disk* dilated, margin undulated. *Fruit* slender, subcylindric, produced into a long beak, carpophore undivided or 2-fid; carpels subterete, primary ridges broad or filiform, secondary 0; vittæ solitary in the interstices, often obscure. *Seed* deeply furrowed in front.—DISTRIB. Europe, N. Africa, temp. Asia; species 8 or 10.—ETYM. The Greek name for a Chervil.

1. **S. Pecten-Ven'eris,** *L.*; fruit ciliate rough dorsally compressed.

A cornfield weed from Ross southwards; ascending to 1,000 ft. in Yorkshire; a colonist, *Watson;* fl. June–Sept.—Branched from the base, pubescent with spreading hairs; branches 6–18 in., rarely more. *Leaves* oblong, 2–3-pinnate, segments very slender. *Umbels* terminal and lateral; rays 1–2

bracteoles many, green, sometimes leafy at the point. *Flowers* very irregular. *Fruit* 1–3 in., very slender, scabrid; styles very short.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India.

19. CHÆROPHYL'LUM, *L.* CHERVIL.

Herbs, often hairy. *Leaves* pinnately- rarely 3-nately decompound. Umbels compound, many-rayed; bracts 1–2 or 0; bracteoles many; flowers white, rarely yellow, often polygamous. *Calyx-teeth* subulate or 0. *Petals* with a long or short inflexed point. *Disk-lobes* small. *Fruit* oblong or linear, hardly beaked, laterally compressed, constricted at the commissure, carpophore undivided or 2-fid; carpels subterete, primary ridges equal, obtuse; vittæ solitary in the interstices. *Seed* deeply grooved in front.—DISTRIB. Europe, N. Africa, N. Asia, N. America; species 30. —ETYM. χαίρω and φύλλον, from the agreeable odour of the *leaf*.

1. **C. tem'ulum,** *L.*; stem swollen below the nodes purple-spotted, fruit glabrous, bracteoles reflexed. *C. temulentum*, Sm.

Fields and waste places from Moray and Ross southwards; ascending to 1,200 ft. in Yorkshire; very rare in Ireland; fl. June–July.—Perennial, laxly hairy. *Stem* 1–3 ft., slender, solid, grooved, leafy, branched. *Leaves* deltoid, 2-pinnate, petioles and peduncles very slender; leaflets ovate, membranous, pinnatifid, crenate. *Umbels* lateral, drooping when young; rays unequal, slender; bracts 0; bracteoles small oblong-lanceolate; flowers small, white. *Fruit* ¼ in., ovoid, narrowed into a slender beak; styles very short, spreading.—DISTRIB. Europe, N. Africa.

20. ANTHRIS'CUS, *Hoffm.* BEAKED-PARSLEY.

Annual or biennial, hairy herbs. *Leaves* deltoid, pinnately or 3-nately decompound. *Umbels* compound; nodding when young; bracts 1, 2, or 0; bracteoles many, entire; flowers white, often polygamous. *Calyx-teeth* minute or 0. *Petals* with an inflexed point. *Disk-lobes* conical or depressed. *Fruit* ovoid or oblong, shortly beaked, commissure constricted, carpophore undivided or 2-fid; carpels sub- or ½-terete, primary ridges confined to the smooth or rough upper part; vittæ very slender, solitary in the interstices, or 0. *Seed* deeply grooved in front.—DISTRIB. Temp. Europe, Asia, N. Africa, N.W. America; species 10.—ETYM. unknown.

1. **A. vulga'ris,** *Pers.*; stem glabrous, umbels peduncled leaf-opposed, fruit hispid. *Scandix Anthriscus*, L.; *Chærophyllum*, Lamk.

Hedgebanks and roadsides, rather rare in Ireland; fl. May–June.—Sparingly hairy. *Stem* 2–3 ft., branched, leafy, fistular, swollen below the nodes. *Leaves* 3-pinnate; leaflets ovate, pinnatifid; segments short, obtuse. *Umbels* of unequal rays; bracts 0; bracteoles short, oblong; flowers minute. *Fruit* ⅛ in., ovoid, muricate, beak short glabrous, pedicel with a ring of hairs at the tip; styles very short.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.—Formerly cultivated as a pot-herb.

2. **A. sylves'tris,** *Hoffm.*; stem hairy below, umbels peduncled terminal, fruit glabrous. *Chærophyllum sylvestre*, L.

Hedgebanks and woods; fl. April–June.—Hairy. *Stem* 2–3 ft., stout, erect, leafy, fistular, furrowed. *Leaves* 2–3-pinnate; leaflets pinnatifid, ovate, coarsely serrate. *Bracts* 0; bracteoles oblong-lanceolate, ciliate, green,

spreading or reflexed, often pink; flowers white. *Fruit* ¼–⅓ in.—DISTRIB. Europe (Arctic), Siberia, Dahuria.

A. CEREFO'LIUM, *Hoffm.*; stem hairy above the nodes, umbels sessile lateral and leaf-opposed, fruit glabrous. *Scandix*, L.; *Chærophyllum sativum*, Gærtn. *Chervil.*

Waste places, rare; always an escape from cultivation; fl. May–July.—Habit of *A. vulgaris*, but stouter, leaflets broader and flowers larger. *Fruit* ½ in., very narrow.—DISTRIB. Europe, excl. Spain and Greece, W. Siberia, W. Asia?—*Root* reputed poisonous.

21. SES'ELI, *L.*

Biennial or perennial, erect, branched herbs. *Leaves* 2–3-pinnate or decompound. *Umbels* compound; bracts many, few, or 0; bracteoles many, undivided; flowers white. *Calyx-teeth* prominent or minute. *Petals* notched, with a long inflexed point. *Disk* depressed or conic, undulate or crenate. *Styles* very short. *Fruit* ovoid or oblong, subterete, commissure broad, carpophore 2-partite; carpels dorsally compressed, primary ridges prominent; vittæ 1 or very rarely 2 in the interstices. *Seed* flat in front.—DISTRIB. Europe, temp. Asia, N. Africa, Australia; species 40.—ETYM. A Greek name.

1. **S. Libano'tis,** *Koch*; glabrous or slightly pubescent, leaves 2-pinnate, leaflets pinnatifid. *Athamanta*, L.

Chalk hills, Sussex, Herts, and Cambridge; fl. July–Aug.—*Rootstock* perennial, crowned with fibres. *Stem* 1–2 ft., stout, erect, furrowed, solid, sparingly branched. *Leaflets* sessile, variable, ovate, petioles short. *Umbels* when in flower subhemispheric; rays many, pubescent; bracts and bracteoles many, subequal, subulate, ciliate, reflexed; flowers small, white. *Fruit* ⅛ in., broadly ovoid, pubescent; styles slender, recurved.—DISTRIB. Europe (Arctic), excl. Spain Greece and Turkey, W. Asia to the Himalaya.

22. FŒNIC'ULUM, *Adanson.* FENNEL.

Tall, glabrous, biennial or perennial herbs. *Leaves* pinnately decompound, segments slender. *Umbels* compound; bracts and bracteoles 0; flowers yellow. *Calyx-teeth* 0. *Petals* with a short obtuse point. *Disk-lobes* large, conical, entire. *Styles* short. *Fruit* ovoid or oblong, subterete, commissure broad, carpophore 2-partite; carpels ½-terete, primary ridges stout; vittæ solitary in the interstices. *Seed* furrowed, flat or slightly concave in front.—DISTRIB. S. Europe, E. Asia, N. Africa; species 4.—ETYM. The old Latin name.

1. **F. vulga're,** *Gærtn.*; leaves shortly petioled, segments slender.

Sea-cliffs, perhaps native from Anglesea southwards and eastwards to Kent, not so elsewhere; S. coast of Ireland; a native? *Watson*; fl. July–Aug.—Glabrous, perennial. *Stem* 2–3 ft., terete, striate, polished, almost solid. *Leaves* much divided; segments very many, linear. *Umbels* large, glaucous; rays very many; flowers small. *Fruit* long, ovoid.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia to India.

22*. *CORIAN'DRUM, L.* CORIANDER.

An annual, slender, branched, glabrous herb. *Leaves* pinnately decompound. *Umbels* compound; rays few; bracts 0; bracteoles few, filiform;

flowers white or pink, outer often irregular. *Calyx-teeth* acute. *Petals* 2-lobed, point inflexed. *Disk-lobes* conical. *Fruit* subglobose or ovoid, carpophore 2-fid; carpels ½-terete, ridges depressed, slender, secondary broadest; vittæ obscure, solitary under each secondary ridge. *Seed* globose, dorsally compressed, top and base incurved.—DISTRIB. S. Europe, N. Africa, W. Asia; species 2.—ETYM. κόρις, from the *bug*-like smell.

C. SATI'VUM, *L.*; leaflets of lower leaves ovate lobed and crenate.

Waste places in S. and E. of England; an escape from cultivation; fl. June.—*Stem* 1–2 ft., slender, erect, fistular. *Leaves* membranous, lowest 1–2- upper 2–3-pinnate with narrow leaflets. *Umbel* peduncled, rays 5–10; bracteoles short, linear, acute; flowers small, very irregular. *Fruit* ⅛ in. diam., subglobose; carpels cohering; styles slender, flexuous.—DISTRIB. S.E. Europe, W. Asia.—Three carpels and styles occur. Fœtid of bugs.

23. CRITH'MUM, *L.* SAMPHIRE.

A fleshy, glabrous, much-branched herb, woody at the base. *Leaves* 3-nately compound; segments quite entire. *Umbels* compound, many-rayed; bracts and bracteoles many, short. *Calyx-teeth* 0. *Petals* minute, broad, fugacious, point long inflexed. *Disk-lobes* thick, depressed or subconic. *Fruit* ovoid-oblong, terete, commissure broad, carpophore 2-partite, outer layer corky loose; carpels ½-terete, primary ridges thick, acute; vittæ many; styles short. *Seed* flat in front.—DISTRIB. Coasts of Europe from France southwards, N. Africa.—ETYM. obscure.

1. **C. marit'imum,** *L.*; leaflets linear, lax, fleshy.

Maritime rocks from Ayrshire southwards, all coasts of Ireland; fl. June–Aug.—*Stem* 6–10 in., ascending, flexuous, solid, striate. *Leaves* deltoid; leaflets few, 1–2 in., terete, subulate or subfusiform; petioles short, sheaths long adnate membranous. *Umbels* flat-topped, peduncles stout fleshy; bracts and bracteoles acute, spreading; flowers small, white. *Fruit* ¼ in., oblong, dark green or purplish.—Yields the well-known pickled condiment.

24. ŒNAN'THE, *L.* WATER DROPWORT.

Glabrous herbs, often aquatic. *Roots* fibrous or tuberous. *Leaves* 1–2–3-pinnate, rarely reduced to a fistular petiole. *Umbels* compound; bracts or bracteoles many, rarely few or 0; flowers white, often polygamous and outer rayed. *Calyx-teeth* acute. *Petals* notched or 2-lobed, point long inflexed. *Disk-lobes* conical. *Fruit* ovoid, cylindric or globose, subterete, commissure broad, carpophore 0; carpels ½-terete, 2 lateral primary ridges grooved or much thickened, sometimes obscure; vittæ in each interstice. *Seed* flat in front.—DISTRIB. N. temp. regions, S. Africa, trop. Australia; species 20.—ETYM. οἶνος and ἄνθος, from the *vinous* scent of the *flowers*.

* *Root-fibres many, fleshy. Umbels terminal or terminal and lateral, peduncled; outer flowers of each partial umbel often irregular and male.*

1. **Œ. fistulo'sa,** *L.*; leaves pinnate, stem and petioles terete swollen fistular, fruit narrow-obconic angular.

Ditches and marshes from Argyle southwards, rare in Scotland; common in Ireland; fl. July–Sept.—*Roots* burrowing deep. *Stem* 2–3 ft., stoloniferous, and with whorls of slender root-fibres below, thin-walled, constricted at the nodes. *Leaves* long-petioled; segments few, narrow, distant. *Umbels*

on stout fistular peduncles; rays short, few; bracts 0; partial umbels ½ in. diam., spherical in fruit. *Fruits* ¼ in., crowded, angular; styles long, erect, spinescent; carpels cohering; pedicel not thickened at the top.—DISTRIB. Europe, N. Africa.

2. **Œ. pimpinel'loides,** *L.*; root-fibres usually tuberous beyond the middle, leaves 2-pinnate, segments broad short entire or acutely cut, fruit cylindric grooved and ribbed.

Meadows and banks, rare; Worcester and Suffolk to Devon and Sussex; fl. June–Aug.—*Root-fibres* slender, their tuber ½ in. or less. *Stem* 1–3 ft., erect, furrowed. *Lower leaves* with broad small segments, upper with few long ones, or reduced to petioles. *Umbels* 6–12-rayed, flat-topped; bracts 1–8; partial umbels crowded; bracteoles subulate. *Fruit* $\frac{1}{10}$–$\frac{1}{8}$ in.; pedicels short, stout, much thickened at the top; styles erect, rigid.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia.

3. **Œ. Lachena'lii,** *Gmelin;* root-fibres usually cylindric, leaves 2-pinnate, segments obtusely-lobed, fruit oblong. *Œ. pimpinelloides,* Sm.

Marshes fresh and salt, from Argyle and Haddington southwards; rare in Scotland; all coasts of Ireland; fl. July–Sept.—Very similar to *Œ. pimpinelloides,* but root-fibres never tuberous; root-leaves soon withering; partial umbels not crowded; fruit $\frac{1}{16}$ in., much broader, rounded at the top; styles shorter and slender; pedicel very short, not thickened at the top.—DISTRIB. Europe from Denmark southwards, excl. Greece and Turkey.

4. **Œ. silaifo'lia,** *Bieberstein;* root-fibres usually fusiform, leaves 2-pinnate, segments cut into narrow acute lobes, fruit subcylindric thickened at the base. *Œ. peucedanifolia,* Sm. not Pollich.; *Œ. Smithii,* Watson.

Moist meadows and ditches, local, from Notts. to Lincoln, and Dorset to Kent; fl. June–July.—Very near *Œ. pimpinelloides,* but larger, stouter; root-fibres rarely tuberous in the middle; rays fewer, longer, stouter in fruit; partial umbels not crowded; styles short, erect, rigid.—DISTRIB. Europe from Belgium southwards, excl. Spain Greece and Turkey, N. Africa.

5. **Œ. croca'ta,** *L.*; root-fibres large fusiform, leaves large deltoid 3–4-pinnate, segments cuneate 2–3-lobed, fruit narrow oblong subcylindric.

Marshes and ditches, from Argyle and Elgin southwards; fl. July.—*Root-fibres* as thick as the thumb, with yellow or colourless juice. *Stem* 2–5 ft., stout, branched, fistular. *Petioles* large, sheathing throughout. *Umbels* many, rays long; bracts and bracteoles 0 or many. *Fruit* ⅛–¼ in.; styles erect, rigid; pedicel not thickened at the top.—DISTRIB. Europe from France to Spain and Italy.—A rank poison, often mistaken for celery.

** *Aquatics. Root simple, fusiform, with many slender fibres. Umbels lateral or leaf-opposed, subsessile. Flowers all 2-sexual.*

6. **Œ. Phellan'drium,** Lamk.; erect floating or ascending, leaves 2–3-pinnate finely cut, segments pinnatifid, fruit terete narrow-oblong or ovoid twice or thrice as long as the styles. *Phellandrium aquaticum,* L.

Ponds and ditches, from Haddington southwards; rare in Scotland; fl. July–Sept.—*Stem* 1–4 ft., very stout. *Leaves* sometimes submerged with capillary segments; emersed with broad small obtuse segments. *Umbels* 7–10-rayed; bracts 0; bracteoles many; outer flowers slightly irregular. *Fruit* variable,

⅛–⅙ in.; styles slender, flexuous; pedicel not thickened at the top.—DISTRIB. Europe, excl. Greece and Turkey, Siberia.

Sub-sp. PHELLAN'DRIUM proper; erect, leaves 3-pinnate, segments of submerged leaves capillary, fruits twice as long as the styles.

Sub-sp. FLUVIAT'ILIS, Coleman (sp.); ascending, leaves 2-pinnate, segments of submerged leaves obcuneate, fruit three times as long as the styles.—S. half of England; Kildare Canal, Ireland.

25. ÆTHU'SA, *L.* FOOL'S-PARSLEY.

An annual, leafy, glabrous herb. *Leaves* 3-nately pinnate. *Umbels* compound, terminal and leaf-opposed; bracts 1 or 0; bracteoles 1–5, deflexed, on the outer side of the umbel; flowers white, outer often rayed. *Calyx-teeth* small or 0. *Petals* notched, with an inflexed point. *Disk-lobes* broad, depressed. *Fruit* broadly ovoid, subterete, carpophore slender, 2-partite; carpels dorsally compressed, primary ridges very thick, keeled, or the lateral narrowly winged; vittæ in the interstices solitary; styles very short. *Seed* flattish in front.—DISTRIB. Europe, Siberia; introd. in N. America.—ETYM. αἴθω, because of its *burning* qualities.

1. **Æ. Cyna'pium,** *L.*; leaves deltoid, leaflets pinnatifid.

A weed in cultivated grounds, from Elgin southwards; fl. July–Aug.—*Root* fusiform. *Stem* 1–2 ft. corymbosely branched, terete, striate, fistular. *Leaves* 6 in.; segments ½–1 in., membranous, cuneate at the base, lobes acute; petioles slender. *Umbels* small, rays spreading, irregular; bracteoles 3–5, slender; flowers irregular, small. *Fruit* ⅛ in., green.—A virulent poison, odour nauseous.

26. SILA'US, *Bcsser.* PEPPER SAXIFRAGE.

Perennial, glabrous herbs. *Leaves* pinnately decompound; segments slender. *Umbels* compound; bracts 1, 2, or 0; bracteoles many, small; flowers yellowish. *Calyx-teeth* 0. *Petals* with an incurved tip, base broad truncate. *Disk-lobes* depressed, margins crenate. *Fruit* ovoid, oblong, subterete, commissure broad, carpophore 2-partite; carpels ½-terete, ridges obtusely winged; vittæ obscure; style short, recurved. *Seed* flattish in front.—DISTRIB. Europe, Siberia; species 2.—ETYM. unknown.

1. **S. praten'sis,** *Besser;* leaflets linear-lanceolate entire or 3-lobed.

Meadows and commons, from Fife southwards; very rare in Scotland and Ireland; fl. July–Sept.—*Rootstock* elongate. *Stem* 1–3 ft., angular, grooved, solid, leafless above. *Leaves* 1–3-pinnate; leaflets few, ½–¾ in. *Umbel-rays* 1–2 in., few or many, incurved; bracteoles short, margins scarious; flowers small. *Fruit* ⅛ in., dark brown.—DISTRIB. Of the genus.

27. ME'UM, *Jacquin.* MEU, BALD-MONEY, SPIGNEL.

A perennial, glabrous, very aromatic, tufted herb. *Leaves* mostly radical, pinnately decompound; segments setaceous, densely crowded. *Umbels* compound; bracts linear, 1–3, or 0; bracteoles 4–8, small; flowers white or purplish. *Calyx-teeth* obsolete. *Petals* acute, narrowed to the base, sometimes with a short inflexed point. *Disk-lobes* depressed, margins entire. *Fruit* ovoid-oblong, subterete, commissure broad, carpophore 2-partite; carpels ½-terete, primary ridges winged; vittæ many;

styles very short. *Seed* concave in front.—DISTRIB. W. Europe, from Belgium to Austria and Italy.—ETYM. Perhaps the Greek *μέον*.

1. **M. athamant'icum,** *Jacq.*; stem subsimple, leaves oblong.

Alpine pastures, from Wales and Yorkshire northwards to Moray; ascending to near 1,400 ft. in the Highlands; absent from Ireland; fl. June–July.—*Rootstock* elongate, crowned with fibres. *Stem* 6–18 in. *Leaf-segments* multifid, spreading in all directions; petiole as long as the blade. *Umbels* many-rayed; bracts few; bracteoles membranous, subunilateral; some flowers often male only. *Fruit* brown, ⅓ in.—Rootstock eaten in Scotland.

28. LIGUS'TICUM, *L.* LOVAGE.

Perennial, glabrous herbs. *Leaves* 1–3-ternately-pinnate. *Umbels* compound, many-rayed; bracts many, few, or 0; bracteoles many; flowers white pink or yellow. *Calyx-lobes* small or 0. *Petals* notched, point long inflexed. *Disk-lobes* conical, thick. *Fruit* ovoid or oblong, subterete or dorsally compressed, commissure broad, carpophore 2-partite; primary ridges prominent, acute or winged, lateral often broadest; vittæ many, slender, or obscure. *Seed* flat, or slightly concave in front.—DISTRIB. N. temperate regions; species 20.—ETYM. *Liguria*, where a species abounds.

1. **L. scot'icum,** *L.*; leaves 2-ternately pinnate. *Haloscias*, Fries.

Rocky coasts, local, Northumberland and all Scotland; N. of Ireland, very rare; fl. July.—Dark green, shining. *Rootstock* stout, branched. *Stem* 1–3 ft., erect, sparingly branched, grooved, terete, fistular. *Leaflets* 1–3 in., ovate- or orbicular-cordate, 3-lobed or -partite, crenate. *Umbel-rays* 8–12, 1–2 in.; bracts few, and bracteoles linear-subulate; flowers white or pink, nearly regular. *Fruit* ⅛ in., brown; ridges winged; styles short recurved.—DISTRIB. Europe (Arctic), from Denmark northwards, N. Asia, E. and W. N. America.—Leaves eaten as a pot-herb, root aromatic and pungent.

29. ANGEL'ICA, *L.* ANGELICA.

Tall perennial herbs. *Leaves* ternately 2-pinnate, segments large. *Umbels* compound, many-rayed; bracts few or 0; bracteoles usually many, small; flowers white or purplish. *Calyx-teeth* small or 0. *Petals* with a short inflexed point. *Disk-lobes* depressed. *Fruit* ovoid, dorsally compressed, commissure broad, carpophore 2-partite; carpels broad, flat, lateral primary ridges with flat contiguous membranous wings, dorsal and intermediate elevated; vittæ 1–2 in the interstices. *Seed* dorsally compressed, flat or slightly concave in front.—DISTRIB. Temp. and sub-Arctic N. regions; species 18.—ETYM. *Angelicus*, from its properties.

1. **A. sylves'tris,** *L.*; leaflets petioled obliquely ovate serrate.

Damp copses and banks of streams; ascending to 2,700 ft. in the Highlands; fl. July–Aug.—Glabrous, except the inflorescence. *Stem* 1–5 ft., stout, fistular, striate, green or purple. *Leaves* 1–2 ft., deltoid; leaflets 1–2 in. *Umbels* large, pubescent; rays very many, 1–3 in.; bracts 0, or 1–2, deciduous; bracteoles few, subulate, persistent; flowers white, nearly regular. *Fruit* ⅛–¼ in.; styles slender, reflexed.—DISTRIB. Europe (Arctic), Siberia to Dahuria, W. Asia.—Aromatic, leaf bitter.

30. PEUCED'ANUM, *L.* HOG'S-FENNEL.

Perennial, rarely annual. *Leaves* pinnately or 3-nately compound. *Umbels* compound, many-rayed; bracts many, few, or 0; bracteoles many or 0; flowers white, yellow, or pink, often polygamous. *Calyx-teeth* 0 or small. *Petals* with an inflexed, often 2-fid point. *Disk-lobes* small; margin often expanded, undulate. *Fruit* ovoid, oblong or suborbicular, much dorsally compressed, commissure very broad; carpels flattish, lateral primary ridges of each forming flat contiguous wings, dorsal and intermediate filiform; vittæ 1–3 in each interstice. *Seed* nearly flat. —DISTRIB. Trop. and temp. regions; species 100.—ETYM. obscure.

SECTION 1. **Peuced'anum** proper. Perennial. *Bracts* few or many, bracteoles many. *Calyx* 5-toothed. *Fruit* with narrow wings.

1. **P. officina'le,** *L.*; leaves 3-ternately pinnate, segments long and narrow, bracts few deciduous, flowers yellow. *Sulphur-wort.*

Salt marshes, very rare, Faversham, Whitstable, and Walton; fl. July–Sept. —Glabrous. *Stem* 2–3 ft., terete, solid, furrowed. *Leaves* oblong, segments 1–4 in., flaccid. *Umbels* on spreading subopposite branches; rays many, 2–4 in., spreading; bracteoles short, filiform; flowers minute, central imperfect, pedicels slender. *Fruit* ¼ in.; wings narrow; styles stout, recurved. —DISTRIB. Europe from Belgium southwards, N. Africa, Siberia.—Root yields a stimulant resin; odour of sulphur.

2. **P. palus'tre,** *Mœnch.*; leaves 3-pinnate, leaflets pinnatifid, segments narrow, bracts many persistent, flowers white. *Milk Parsley.*

Marshes, local, from York and Lincoln to Essex and Somerset; fl. July–Aug. —Glabrous; juice milky. *Stem* 3–5 ft., terete, fistular, grooved. *Leaves* ½–1 in., deltoid; leaflets petioled, lanceolate. *Umbels* 1–2 in.; rays many, stout, scabrid; bracts deflexed; flowers minute. *Fruit* ⅛ in., broadly oblong; wings narrow, thick; styles very short.—DISTRIB. Europe, excl. Greece and Turkey, Siberia.—Root abounds in a yellow fœtid gum-resin.

SECTION 2. **Imperator'ia,** *L.* (gen.). Perennial. *Bracts* 0; bracteoles many. *Calyx-teeth* 0. *Fruit* with broad wings.

P. OSTRU'THIUM, *Koch;* leaves 1–2-ternate, leaflets ovate or suborbicular inciso-serrate, base unequal, flowers white. *Master-wort.*

Moist meadows, rare, N. of England and Scotland, naturalized only; fl. July–Aug. — Glabrous. *Stem* 2–3 ft., stout, terete, fistular, furrowed. *Leaves* deltoid; leaflets few, 1–4 in., large, often confluent; petiole very long. *Umbels* large, many-rayed. *Fruit* ⅛ in.; wings very broad; styles short.—DISTRIB. Mid. Europe.—Formerly cultivated as a pot-herb and medicine.

SECTION 3. **Pastina'ca,** *L.* (gen.). *Bracts* and *bracteoles* 0. *Calyx-teeth* 0. *Fruit* with rather narrow wings.

3. **P. sati'vum,** *Benth.*; leaves pinnate, leaflets sessile ovate inciso-serrate, flowers bright yellow. *Wild Parsnip.*

Roadsides and waste places, from Durham and Lancaster southwards; a garden escape in Scotland; a doubtful native of Ireland; fl. July–Aug.—Annual or biennial, pubescent. *Stem* 2–3 ft., stout, angled, furrowed, fistular. *Leaves*

shining; leaflets 2-5 pair, 1-3 in. *Umbel-rays* many, stout, long; flowers small. *Fruit* ¼ in., broadly oblong; styles very short.—DISTRIB. Europe, Siberia; introd. in N. America.—Cultivated since the time of the Romans.

31. HERAC'LEUM, *L.* COW-PARSNIP, HOGWEED.

Biennial or perennial herbs, sometimes gigantic. *Leaves* 1-3-pinnate; segments broad, lobed and toothed. *Umbels* compound, many-rayed; bracts few, many, or 0; flowers often polygamous and outer rayed, white pink or yellowish. *Calyx-teeth* small or 0. *Petals* often unequal, the larger or all notched or 2-lobed, point inflexed. *Disk-lobes* small, depressed or conical. *Fruit* orbicular obovate or oblong, much dorsally compressed, commissure very broad, carpophore 2-partite; carpels flat, lateral primary ridges expanded into flat, contiguous, membranous wings, dorsal or intermediate slender; vittæ 1 in each interstice, short, thickened downwards. *Seed* flat.—DISTRIB. Europe, N. and trop. Africa, temp. Asia, and N. America; species 50.—ETYM. The god *Hercules*.

1. **H. Sphondyl'ium,** *L.*; leaves pinnate, leaflets few large lobed.

Moist woods and meadows; ascending to 2,700 ft. in the Highlands; fl. June–Aug.—Rough, with rather rigid scattered hairs. *Stem* very stout, 3-6 ft., fistular, grooved, branched above. *Leaves* 1-3 ft.; segments 2-6 in., pubescent beneath, very variable in size lobing and toothing, sometimes narrow and pinnatifid (*H. angustifolium*, Sm.), terminal connate at the base; sheath of petiole broad. *Umbel-rays* ½–1½ in., many, stout; flowers large, outer very irregular, petals very broad deeply obcordate, white or pink. *Fruit* ¼–⅓ in., obovoid, retuse; styles very short.—DISTRIB. Europe, N. Africa, N. Asia.—Stem eatable.

32. TORDYL'IUM, *L.*

Annual, hairy or woolly. *Leaves* simple or pinnate. *Umbels* compound; rays many, or few and unequal; bracts and bracteoles linear, sometimes small or 0; flowers white or purplish, outer often rayed. *Calyx-teeth* subulate and unequal or 0. *Petals* with an incurved point, the larger or all 2-lobed. *Disk* flat and undulate, or conical. *Fruit* orbicular or oblong, much dorsally compressed; lateral primary ridges closely contiguous, broad, thickened, dorsal and intermediate slender; vittæ 1-3 in each interstice. *Seed* flattened.—DISTRIB. Europe, N. Africa, temp. Asia; species 12.—ETYM. The old Greek name.

1. **T. max'imum,** *L.*; leaves pinnate, leaflets 1-3 pair pinnatifid.

Hedgebanks, Eton, Oxford, and Isleworth; an alien or denizen, *Watson*; fl. June to July.—Hispid with short hairs, reflexed on the stem. *Stem* 1-2 ft., slender, erect, deeply grooved, fistular. *Leaflets* ¼–1 in., oblong or lanceolate, more or less cut and toothed; petioles with small sheaths. *Umbels* small; rays 6-8, stout, short, hispid; bracts and bracteoles as many, stiff, short; flowers small, white or pink, subsessile. *Fruit* broadly-oblong, hispid, margin thickened glabrous; styles short, stiff, erect.—DISTRIB. Europe from Belgium southwards.

33. DAU'CUS, *L.* CARROT.

Annual or biennial, hispid herbs. *Leaves* pinnately decompound, segments small. *Umbels* compound; rays many, outer arching over the

inner or few and irregular ; bracts and bracteoles many or 0, entire or cut ; flowers white, outer often rayed. *Calyx-teeth* slender or 0. *Petals* notched, with an inflexed point, often unequal. *Disk-lobes* depressed or conical. *Fruit* ovoid or oblong, carpophore undivided or 2-fid ; carpels convex, secondary ridges more prominent than the primary, all, or the secondary only, with rows of spines ; vittæ solitary under each secondary ridge. *Seed* flattish in front.—DISTRIB. Europe, N. Africa, W. Asia ; species 20. —ETYM. The old Greek name.

1. **D. Carot'a,** *L.*; leaves 3-pinnate, leaflets ovate cut.

Fields and sea-shores ; fl. June–Aug.—Hispid. *Stem* 1–2 ft., branched, solid, furrowed. *Leaflets* very many, small. *Umbels* peduncled, rays 1–2 in.; bracts usually pinnatifid, bracteoles lanceolate ; flowers white, central purplish. *Fruit* ⅛ in., broadly oblong ; styles short, stout, straight.—DISTRIB. Europe, N. Africa, N. Asia, W. Asia to India ; introd. in N. America.

VAR. 1, *Carot'a* proper; erect, branches above spreading, leaf-segments narrow subdistant, umbels concave, spines of the fruit distinct usually hooked at the tip.—VAR. 2, *gum'mifer,* Lamk. (sp.) ; branches spreading from the base, leaf-segments broader closer, umbels convex, spines of fruit dilated and connate at the base. *D. maritimus,* With. Shores of S. England.

34. CAUCA'LIS, *L.*

Annual, hispid herbs. *Leaves* 1–3-pinnate. *Umbels* compound, terminal or leaf-opposed, usually of few rays, sometimes capitate ; bracts few or 0 ; bracteoles more numerous ; flowers white or purplish, polygamous, outer often rayed. *Calyx-teeth* acute or 0. *Petals* often unequal, the larger notched, point inflexed. *Disk-lobes* thick, conical. *Fruit* ovoid or oblong, constricted at the commissure, carpophore undivided or 2-fid ; carpels subterete, ridges with 1 or 2 series of spines ; vittæ solitary in each secondary ridge. *Seed* deeply grooved in front.—DISTRIB. Europe, N. Africa, temp. Asia ; species 18.—ETYM. The old Greek name.

SECTION 1. **Cauca'lis** proper. *Secondary ridges* very prominent, with 1 row of spreading spines. *Bur-Parsley.*

1. **C. daucoi'des,** *L.*; leaves 2–3-pinnate, segments oblong pinnatifid.

Chalky fields on the E. and S. coasts, from York and Durham southwards ; a colonist, *Watson ;* fl. June–July.—*Stem* 6–18 in., erect, hispid at the nodes, angular, grooved, solid ; branches spreading. *Leaves* 3–4 in.; segments small. *Umbel-rays* 2–5 ; bracts few or 0 ; bracteoles linear ; male flowers (outer) white or pink, pedicelled, female subsessile. *Fruit* ⅓–½ in., oblong ; spines hooked, of the secondary ridges longest ; styles short, stout, erect.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia.

SECTION 2. **Turge'nia,** *Hoffm.* (gen.). *Secondary ridges* with 2–3 rows of spreading spines.

C. LATIFO'LIA, *L.*; leaves pinnate, leaflets few subpinnatifid.

Cornfields, very rare, Somerset, Hertford, Cambridge ; a colonist or alien, *Watson ;* fl. July.—Hispid. *Stem* 6–18 in., simple, terete, striate, fistular. *Leaflets* narrow-oblong, lobes ¼–¾ in. *Umbel-rays* 2–4, stout ; bracts broadly lanceolate, membranous ; flowers much as in *C. daucoides,* pink. *Fruit*

¼–½ in., broad; spines long, nearly equal, rough; styles short, stout, erect. —DISTRIB. Europe from Belgium southwards.

SECTION 3. **Tori'lis,** *L.* (gen.). *Fruit* covered between the primary ridges with spreading or appressed bristles. *Hedge Parsley.*

2. **C. Anthris'cus,** *Huds.*; leaves 1–2-pinnate, leaflets broad, umbels terminal compound, bracts 4–6, spines of fruit incurved not hooked.

Hedges and waste places, from Moray and Isla southwards; ascending to 1,350 ft. in Yorkshire; fl. July–Sept.—Hispid more or less. *Stem* erect, branched, solid, striate, hairs reflexed. *Leaflets* many, close set, ¼–½ in., pinnatifid or lobed. *Umbels* 5–12-rayed; bracts small, subulate; flowers minute, white or pink, outer pedicelled, fertile. *Fruit* ⅛ in., ovoid; styles short, straight.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India.

3. **C. infes'ta,** *Curtis;* leaves 1–2-pinnate, leaflets lax narrow, umbels terminal compound, bracts 0 or 1, spines of fruit spreading hooked.

Fields and waste places from Lancaster and Yorkshire southwards; a colonist, *Watson;* fl. July–Sept.—Hispid. *Stem* 6–10 in., much branched, often from the base, angled, solid, leafy. *Leaflets* pinnatifid, or cut and serrate, oblong. *Umbel-rays* 2–8, short; bracteoles linear or setaceous; flowers white or pink, irregular, outer fertile. *Fruit* oblong, covered with spines; styles rather slender.—DISTRIB. Europe from Belgium southwards, N. Africa.

4. **C. nodo'sa,** *Scop.*; leaves 1–2-pinnate, leaflets very small, umbels leaf-opposed simple, spines of fruit spreading hooked and barbed.

Dry banks from Forfar southwards, rare in Scotland and Ireland; fl. May–July.—Hispid. *Stem* 6–18 in., often prostrate, slender, flexuous, angled, solid. *Leaflets* pinnatifid. *Umbels* shortly peduncled, subglobose; pedicels very short, stout; bracts 0; flowers small, regular, pink; female subsessile. *Fruit* ⅛–¼ in., ovoid, inner of each umbel tubercled, outer with one or both carpels furnished with hooked spines; styles very short.—DISTRIB. Europe, from Denmark southwards, W. Africa, W. Asia to India.

ORDER XXXVI. **ARALIA'CEÆ.**

Erect or climbing shrubs or trees; pubescence often stellate. *Leaves* alternate, simple or compound; stipules aduate to the petiole or 0. *Flowers* regular, 1–2-sexual, umbellate or capitate. *Calyx-limb* superior, very short, entire toothed or lobed. *Petals* 5, often coriaceous, very deciduous, valvate or slightly imbricate in bud. *Stamens* 5, filaments inflexed; anthers didymous, versatile. *Disk* epigynous. *Ovary* 2- or -more celled; styles 0, or as many as cells, free or connate, stigma terminal or decurrent on the inner face of the style; ovule 1 in each cell, pendulous, anatropous, raphe ventral, integuments confluent with the nucleus. *Drupe* or *berry* with 1 or more 1-seeded cells. *Seed* pendulous, testa membranous, albumen dense, fleshy; embryo minute, ovoid or oblong.—DISTRIB. Chiefly trop.; genera 38; species 340.—AFFINITIES. Close with *Cornæ* and *Umbelliferæ.*—PROPERTIES unimportant.

1. **HED'ERA,** *L.* IVY.

Climbing shrubs. *Leaves* undivided or lobed, exstipulate. *Umbels* panicled; bracts minute or 0; pedicels not jointed; flowers polygamous.

Calyx-limb entire or 5-toothed. *Petals* and *stamens* 5. *Disk* tumid. *Ovary* 5-celled; styles short, connate, stigmas terminal. *Berry* subglobose, cells with a parchment-like endocarp closely investing the ovoid seed. *Albumen* lobulate.—DISTRIB. Temp. regions of the Old World, Australia; species 2.—ETYM. unknown.

1. **H. He'lix,** *L.*; shrubby, climbing by adhesive rootlets.

Rocks, woods, and walls; ascends to 1,350 ft. in Yorkshire; fl. Oct.–Nov.—*Trunk* 4–10 in. diam., trailing and flowerless, or ascending, and flowering at the terminal free branches. *Leaves* very variable, 1–3 in. broad, cordate, 5-lobed, lobes deep or shallow acute or obtuse; those of flowering branches ovate or lanceolate. *Umbels* subracemose, subglobose, clothed with stellate hairs; bracts small, concave; peduncles ½–1 in. *Flowers* yellow-green, ¼ in. diam.; calyx-teeth deltoid; petals triangular-ovate. *Berry* black, rarely yellow, globose, ½ in. diam.—DISTRIB. Europe, N. Africa, W. Asia to the Himalaya.—The small sylvestral form, with longer leaf-lobes and often pale nerves, never flowers. The so-called *Irish Ivy*, with broad rather fleshy leaves and 8-rayed stellate hairs, is a doubtful native of Ireland.

VAR. *Hodgen'sii*, another doubtfully native Irish form, has deeply 5–7-lobed leaves and 12–15-rayed scaly hairs.

ORDER XXXVII. CORNA'CEÆ.

Shrubs or trees, rarely herbs. *Leaves* opposite or alternate, exstipulate. *Flowers* small, regular, in terminal or axillary cymes, umbels or heads, sometimes involucrate. *Calyx-limb* superior 0 or small, open or valvate in bud. *Petals* 4–5, at the base of the disk, valvate or imbricate in bud. *Stamens* 4–5, inserted with the petals, free; anthers adnate or versatile, bursting in front or laterally. *Disk* epigynous, annular. *Ovary* 1–4-celled; style 1, stigma simple or lobed; ovules solitary in each cell, pendulous, anatropous, raphe dorsal or lateral, integuments confluent with the nucleus. *Drupe* with a 1–4-celled stone, or 1–4 stones. *Seed* oblong, testa membranous, albumen copious fleshy; embryo minute or elongate.—DISTRIB. Chiefly N. temp. regions; genera 12; species 75.—AFFINITIES. Close to *Caprifoliaceæ* and *Araliaceæ*.—PROPERTIES unimportant.

1. COR'NUS, *L.* CORNEL, DOGWOOD.

Herbs, trees, or shrubs. *Leaves* opposite, rarely alternate. *Flowers* small, in dichotomous cymes or involucrate umbels or heads, white or yellow. *Calyx-teeth* 4, minute. *Petals* 4, valvate in bud. *Stamens* 4. *Disk* tumid or obsolete. *Ovary* 2-celled; stigma capitate or truncate. *Drupe* ovoid or oblong, areolate at the top, stone 2-celled. *Cotyledons* foliaceous.—DISTRIB. N. temp. regions, Peru; species 25.—ETYM. *cornu*, from the *horny* hardness of the wood.

1. **C. sanguin'ea,** *L.*; shrubby, cymes corymbose ebracteate. *Dogwood, Dogberry, Prickwood.*

Copses and hedges in England, N. and W. of Ireland, rare; fl. June–July.—Pubescent, 6–8 ft., branchlets and leaves red in autumn. *Leaves* 2–3 in., petioled, ovate, or ovate-oblong, acute; lateral nerves subbasal. *Cymes* terminal, peduncled, subglobose, dense-flowered. *Flowers* ⅛ in. diam., cream-white. *Berry* small, black.—DISTRIB. Europe, Siberia, W. Asia.—

Wood used for skewers, formerly for arrows, and indiscriminately with that of *Rhamnus Frangula*, as Dogwood, by gunpowder makers. An oil used for soapmaking is extracted from the berries in France.

2. **C. sue'cica,** *L.*; herbaceous, umbels involucrate.

Alpine moors, Yorkshire, Cheviots, and Scotland, ascending to nearly 3,000 ft.; fl. July–Aug.—Puberulous with appressed hairs. *Rootstock* slender, creeping. *Stem* 6–8 in., erect, forked at the top, 4-angled, scaly below. *Leaves* ½–1 in., sessile, in few pairs, oblong or ovate, acute, 5–7-nerved, glaucous below. *Umbel* in the fork, peduncled; bracts 4, ¼ in., white, ovate, acute. *Flowers* minute, purplish. *Drupe* ¼ diam., red.—DISTRIB. N. and Arctic Europe, Asia, E. and W. N. America.

DIVISION II. MONOPET'ALEÆ.

ORDER XXXVIII. CAPRIFOLIA'CEÆ.

Shrubs or small trees, rarely herbs. *Leaves* opposite, simple, ternately cut, or pinnate, usually exstipulate. *Flowers* cymose. *Calyx-limb* superior, 4–5-toothed or lobed. *Corolla* regular or irregular, sometimes 2-lipped; lobes 5, imbricate in bud. *Stamens* 4, 5, 8 or 10, inserted on the corolla-tube, equal or unequal; anthers versatile, rarely bursting outwardly. *Disk* epigynous, glandular, or 0. *Ovary* 1–6-celled; style simple or 3–5-lobed or 0, stigmas capitate; ovules solitary, pendulous from the top of the cell, or many from its inner angle, or solitary in one cell and several in others, anatropous, raphe dorsal or lateral, integuments confluent with the nucleus. *Fruit* a berry or drupe, rarely capsular, 1- or many-seeded. *Seeds* small, testa usually membranous, albumen copious, fleshy; embryo minute, ovoid, rarely large and terete.—DISTRIB. Temp. and sub-trop. regions of the N. hemisphere; rare in the south, absent in trop. and S. Africa; genera 14; species 200.—AFFINITIES. With *Cornea* and *Rubiaceæ*.—PROPERTIES unimportant.

TRIBE I. **SAMBU'CEÆ.** *Corolla* rotate, regular. *Ovary* cells 1-ovuled; style short, 2–3-partite, or stigma sessile.

Shrubs. Leaves simple ..... 1. Viburnum.
Herbs, shrubs, or trees. Leaves pinnate ..... 2. Sambucus.
Herbs. Leaves 3-nately compound ..... 3. Adoxa.

TRIBE II. **LONICE'REÆ.** *Corolla* tubular or campanulate. *Ovary*-cells 1- or many-ovuled; style slender.

Ovary 2–3-celled, cells with several ovules ..... 4. Lonicera.
Ovary 3-celled, 1 cell 1-ovuled, 2 many-ovuled ..... 5. Linnæa.

1. VIBUR'NUM, *L.*

Shrubs or trees; branches opposite. *Leaves* simple; stipules 0 or small. *Flowers* in terminal or axillary corymbs or panicles, white or pink, jointed on the pedicel, 1–2-bracteolate; outer sometimes male or neuter, with larger petals. *Calyx-tube* turbinate or ovoid; limb 5-toothed. *Corolla* rotate, tubular or campanulate, 5-lobed. *Stamens* 5. *Disk* 0. *Ovary* 1–3-celled; style conical, 3-fid, or stigmas 3 sessile; ovule 1, pendulous in each cell.

Drupe dry or fleshy, terete or compressed, 1- or spuriously 2–3-celled, 1-seeded. *Seed* compressed; embryo minute.—DISTRIB. Temp. and sub-trop. regions of the N. hemisphere, Andes.—ETYM. unknown.

1. **V. Lanta'na,** *L.*; scurfily pubescent, leaves broadly oblong-cordate serrulate exstipulate, flowers all perfect. *Wayfaring-tree.*

Dry copses and hedges, from Yorkshire southwards, naturalized elsewhere; fl. May–June.—Shrubby, 6–20 ft.; pubescence stellate. *Leaves* 2–4 in., rugose, obtuse. *Cymes* flat-topped, rays stout. *Flowers* ¼ in. diam., white, 2-bracteolate at the base. *Corolla* shortly funnel-shaped. *Stamens* shortly exserted. *Drupe* flattened, ⅓ in., black when ripe. *Seed* grooved in front. —DISTRIB. Europe from Belgium southwards, N. Africa.—Bark acrid.

2. **V. Op'ulus,** *L.*; subglabrous, leaves 3-lobed stipulate, outer flowers larger neuter. *Guelder-rose.*

Copses and hedges from Ross and Moray southwards; rare in Scotland; common in Ireland; fl. June–July.—Shrubby, 6–8 ft., buds scaly; branches slender, lenticellate. *Leaves* 2–3 in., young downy, lobes unequal, serrate; stipules linear, glandular, adnate to the petiole. *Cymes* 2–4 in. diam., subglobose; flowers white, outer ⅝ in. diam., rotate; inner cream-white, campanulate, ¼ in. diam. *Drupe* ½ in., subglobose, compressed, red, translucent. *Seed* compressed, keeled on the flat surfaces.—DISTRIB. Europe, Siberia, Dahuria, E. and W. N. America.

2. SAMBU'CUS, *L.* ELDER.

Large herbs, shrubs, or trees; branches stout, pith thick. *Leaves* pinnate. *Flowers* small, in umbellate corymbs or panicles, jointed on to the pedicel, bracteolate. *Calyx-limb* 3–5-toothed. *Corolla* rotate or campanulate, 3–5-partite. *Stamens* 5; anthers dehiscing outwardly or laterally. *Disk* 0 or convex. *Ovary* 3–5-celled; style short, 3–5-partite, or stigmas 3–5 sessile; ovules 1 in each cell, pendulous. *Drupe* with 3–5 cartilaginous cells. *Seed* compressed; embryo long.—DISTRIB. All temp. regions (S. Africa excepted) and trop. mountains; species 10–12.—ETYM. *σαμβύκη*, being formerly used for *musical instruments.*

1. **S. Eb'ulus,** *L.*; herbaceous, stipules leafy serrate, cymes 3-rayed corymbose compact. *Dwarf Elder, Dane-wort.*

Waste places, rare and local, from Forfar southwards; introduced in Ireland; a denizen, *Watson;* fl. July–Aug.—Glabrous. *Rootstock* creeping. *Stems* 2–4 ft., many, stout, ribbed and grooved. *Leaflets* 4–6 in., 4–6 pair, oblong-lanceolate, serrate. *Cyme* 3–4 in. diam. *Corolla* broadly campanulate, white tipped with pink. *Filaments* crumpled. *Berry* small, globose, black.—DISTRIB. Europe, N. Africa.—Plant fœtid, emetic, and purgative.

2. **S. ni'gra,** *L.*; a tree, stipules small or 0; cymes 5-rayed. *Elder.*

Hedges and thickets from Fife and Forfar southwards, ascending to 1,350 ft. in Yorkshire; a denizen in Scotland, *Watson;* fl. June.—*Trunk* often as thick as the thigh; bark corky; buds scaly; branchlets angular, lenticellate. *Leaflets* 2–4 pair, 1–3 in., ovate oblong or lanceolate, serrate. *Cymes* 4–6 in. diam., flat-topped. *Corolla* ¼ in. diam., white, rotate, lobes rounded. *Filaments* slender. *Berry* small, globose, black, rarely green.—DISTRIB. Europe, N. Africa.—Berries used for wine; flowers for making perfumes. The "Cut-leaved Elder," a laciniate-leaved variety, occurs as a garden escape.

3. ADOX'A, *L.* MOSCHATEL.

A small glabrous succulent herb. *Rootstock* creeping; buds scaly; stem simple, 2-leaved. *Leaves* ternately cut. *Flowers* small, green, in a 5-flowered peduncled head, terminal 4 lateral 5-merous. *Calyx-tube* hemispherical; limb ½-superior, 2–3-lobed. *Corolla* rotate, 4–5-lobed. *Stamens* 8–10, on the tube of the corolla, in pairs alternating with its lobes; anthers peltate, 1-celled. *Disk* 0. *Ovary* 3–5-celled; style short, 3–5-partite, stigma terminal; ovules solitary in each cell, pendulous. *Drupe* girt by the calyx-teeth, with 3–5 compressed cartilaginous cells. *Seeds* obovate, embryo minute.—DISTRIB. Europe, N. Asia, Himalaya, E. and W. N. America.—ETYM. ἄ and δόξα, in allusion to its insignificance. —Each pair of stamens is perhaps one, with separate anther-cells.

1. **A. Moschatelli'na,** *L.*; leaflets broadly triangular-ovate.

Damp hedgebanks and tree roots, rather local; ascends 3,300 ft. in the Highlands; fl. April–May.—*Stems* 6–8 in., 4-angled. *Radical leaves* 1-2-ternate, leaflets ½–¾ in., irregularly 3-lobed; petiole slender, dilated at the base; cauline 3-foliolate. *Head* ½–¾ in. diam., sub-4-angular, yellow-green. *Corolla* ¼ in. diam. *Fruit* succulent, green.—Odour musky. A Kashmir variety has 5–6-merous flowers.

4. LONICE'RA, *L.* HONEYSUCKLE.

Erect, prostrate, or climbing shrubs, with scaly buds. *Leaves* opposite, entire, exstipulate, of the young shoots sometimes lobed. *Flowers* in peduncled cymes or heads, often connate in pairs by the ovaries, and subtended by connate bracteoles. *Calyx-tube* ovoid or subglobose; teeth 5, often unequal. *Corolla* tubular, funnel- or bell-shaped; tube equal or gibbous at the base; limb oblique or 2-lipped, 5-lobed. *Stamens* 5. *Disk* tumid. *Ovary* 2–3-celled; style filiform, stigma capitate; ovules many in the inner angle of each cell. *Berry* fleshy, 2–3-celled; cells few-seeded, septa sometimes wanting. *Seeds* ovoid or oblong, testa crustaceous.—DISTRIB. Temp. and warm regions of the N. hemisphere; species 80.—ETYM. *A. Lonicer*, a German botanist.

1. **L. Periclymenum,** *L.*; leaves ovate or oblong upper sessile, flower-heads terminal peduncled. *Woodbine* or *Honeysuckle.*

Hedges and copses; ascends to 1,500 ft. in Durham; fl. June–Sept.—Glabrous or slightly pubescent. *Stem* 10–20 ft., climbing. *Leaves* 1–3 in., lower shortly petioled, upper sessile, glaucous below. *Bracts* small. *Calyx-teeth* persistent. *Corolla* 1–1½ in., glandular-pubescent, dirty red outside, yellow within. *Berries* globose, crimson.—DISTRIB. Europe, N. Africa.

L. CAPRIFO'LIUM, *L.*; upper leaves connate, heads terminal sessile.

Copses in Cambridge and Oxford; doubtless introduced; fl. May–June.—Glabrous. *Stem* twining. *Leaves* glaucous beneath; lower petoiled, broadly ovate or oblong; upper oblong or triangular, connate by very broad bases. *Bracts* leafy, very large, connate. *Calyx-limb* short, persistent. *Corolla* as in *L. Periclymenum*. *Berries* globose, scarlet.—DISTRIB. Mid. and S. Europe.

L. XYLOS'TEUM, *L.*; leaves petioled, flowers axillary in pairs.

Copses, Sussex, Hertfordshire; not indigenous; fl. May–June.—Pubescent.

Stem suberect. *Leaves* 2–3 in., shortly petioled, ovate or obovate. *Peduncles* shorter than the leaves, 2-flowered; bracts 2, linear; bracteoles minute. *Flowers* sessile, connate by the ovaries. *Calyx-limb* deciduous. *Corolla* ½ in., pubescent, yellow. *Berries* small, crimson.—DISTRIB. Europe, Siberia.

5. LINNÆ'A, *Gronovius.*

A very slender, creeping, evergreen shrub; branches ascending, ending in a slender, erect, 2-flowered peduncle. *Leaves* opposite, exstipulate. *Flowers* nodding, on slender 2-bracteolate pedicels. *Calyx-tube* ovoid; lobes 5, narrow, deciduous. *Corolla* subcampanulate; lobes 5, rather unequal. *Stamens* 4, inserted near the base of the corolla, 2 longer than the others. *Disk* obsolete. *Ovary* 3-celled; style filiform, stigma capitate; ovules many in 2 of the cells, one in the third, pendulous. *Fruit* obliquely subglobose, 3-celled, one cell 1-seeded, the others seedless. *Seed* oblong; embryo cylindric.—DISTRIB. Lapland to N. Italy, cold and Arctic Asia, and N. America.—ETYM. Linnæus.

1. **L. borea'lis,** *Gronov.*; leaves broadly ovate obtuse crenate.

Fir forests and plantations, chiefly in Mid. and E. of Scotland, ascending to 2,400 ft.; also doubtfully indigenous in Northumberland and Dorset; fl. July.—Almost glabrous, except the glandular inflorescence. *Stems* 3–16 in., filiform. *Leaves* in distant pairs, ¼–¾ in., petioled, rarely obovate or orbicular, coriaceous. *Peduncles* erect, filiform, 2-bracteate at the top. *Corolla* ⅓ in., pink, sweet-scented. *Fruit* very small.—Fruit very rare indeed. I have taken the description of it from Wahlenberg.

ORDER XXXIX. RUBIA'CEÆ.

Tribe STELLA'TÆ.

Slender herbs, sometimes shrubby below; stems 4-angled. *Leaves* whorled, entire. *Flowers* very small, in axillary or terminal subsessile or peduncled cymes; pedicels jointed under the flower. *Calyx-limb* superior, annular or 4–6-toothed or 0. *Corolla* rotate, bell- or funnel-shaped; lobes 3–5, valvate in bud. *Stamens* 3–5, inserted in the corolla-tube, filaments usually short; anthers dorsally fixed, didymous. *Ovary* 2-celled; styles 2, stigmas terminal; ovules solitary in each cell, attached to the septum, pendulous, amphitropous, raphe ventral, integuments confluent with the nucleus. *Fruit* didymous, of 2 plano-convex indehiscent 1-seeded cocci. *Seed* ascending, plano-convex, testa membranous adnate to the pericarp, albumen horny; embryo axile, cotyledons foliaceous, radicle terete.—This Tribe is the representative in N. temp. regions of the enormous family of *Rubiaceæ*, for an account of which I must refer to general works on Botany. —DISTRIB. All cold and temp. regions; genera 7; species about 300.—AFFINITIES. With *Caprifoliaceæ* and *Valerianeæ*.—PROPERTIES unimportant. *Rubia* yields Madder.

Calyx-limb entire or obsolete.
- Corolla rotate or bell-shaped, 5-lobed. Fruit fleshy .....1. Rubia.
- Corolla rotate, 4-lobed. Fruit dry.....2. Galium.
- Corolla bell-shaped. Fruit dry.....3. Asperula.

Calyx-limb 4–6-toothed. Corolla funnel-shaped. Fruit dry....4. Sherardia.

1. RU'BIA, *L.* MADDER.

Perennial herbs, often woody below. *Cymes* axillary and terminal. *Calyx-limb* 0, or annular. *Corolla* campanulate or rotate, 5-lobed. *Styles* 2, short, connate at the base, stigmas capitate. *Berry* didymous or globose, succulent.—DISTRIB. Chiefly temp. regions; species about 50.—ETYM. *ruber*, from the *red* dye.

1. **R. peregri'na,** *L.*; leaves 4–6 in a whorl elliptic or oblong.

Rocky copses and waste places from N. Wales, southwards and eastwards, to Kent; local in Ireland; fl. June–Aug.—Evergreen, shining, 1–2 ft., glabrous except for the recurved prickles on the angles of stem, midrib, and margins of the leaves. *Leaves* 1–3 in. *Cymes* panicled, longer than the leaves. *Corolla* yellowish, $\frac{1}{12}$ in. diam., lobes spreading. *Stamens* short. *Fruit* small, black, globose and 1-celled, or didymous.—DISTRIB. W. and S. Europe.

2. GA'LIUM, *L.* BEDSTRAW.

Annual or perennial herbs. *Flowers* minute, in axillary or terminal cymes. *Calyx-limb* annular. *Corolla* rotate, 4- rarely 5-lobed. *Stamens* 4. *Styles* 2, short, connate at the base; stigmas capitate. *Fruit* didymous, dry, often hispid or tubercled.—DISTRIB. Chiefly temp. climates; species about 150.—ETYM. γάλα, from some species being used to curdle *milk*.

* *Perennial. Flowers yellow. Fruit glabrous, minute, smooth.*

1. **G. ve'rum,** *L.*; leaves in whorls of 8–12. *Lady's Bedstraw.*

Sandy banks, shores, &c.; ascends to near 2,000 ft. in the Highlands; fl. June–Sept.—Pubescent; rootstock stoloniferous. *Stems* many, 1–3 ft., erect or ascending, 4-angled. *Leaves* ¼–1 in., linear, deflexed, rough above, mucronate, margin recurved. *Cymes* very compound, axillary and terminal, leafy; flowers 2-sexual. *Fruit* small, black.—DISTRIB. Temp. Europe, N. Africa, Siberia Dahuria; introd. in N. America.—Flowers used to curdle milk.

VAR. 1, *ve'rum* proper; black when dry, flowers golden-yellow. Var. *lu'teum*, Syme.—VAR. 2, *ochrolew'cum*, Syme; greenish when dry, flowers pale yellow. Sand-hills, Deal, with *G. Cruciata*; perhaps a hybrid.

2. **G. Crucia'ta,** *Scopoli*; leaves 4 in a whorl elliptic hairy above, and beneath. *G. cruciatum*, With.; *Valantia Cruciata*, L. *Crosswort.*

Copses and hedges, from Elgin and the Hebrides southwards; fl. April–June.—*Rootstock* creeping. *Stems* 6 in.–2 ft., slender, decumbent, branched at the base. *Leaves* ½–1 in., 3-nerved. *Cymes* axillary, few-flowered, peduncles short; flowers ⅛ in. diam., outer male. *Fruit* globose, pedicels recurved.—DISTRIB. Europe from Holland southwards, Siberia, W. Asia.

** *Perennial. Cymes both axillary and terminal. Flowers white. Fruit glabrous, smooth granulate or rough, very minute.*

3. **G. palus'tre,** *L.*; stems rough prickly lax, leaves 4–6 in a whorl obtuse, cymes diffuse, fruiting pedicels divaricate.

Marshes and ditches; ascends to near 2,000 ft. in Northumberland; fl. July–Aug.—Glabrous except the leaf-margins, black when dry, very variable. *Rootstock* creeping. *Stems* 6 in.–3 ft., flaccid, decumbent or ascending, branched throughout. *Leaves* ½–1 in., shining, oblong linear or lanceolate-oblong, margins with reflexed prickles. *Cymes* corymbose, longer than the leaves. *Corolla-lobes* acute. *Fruit* minute, smooth.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Persia, Greenland.

VAR. 1, *palus'tre* proper; stem smoother, leaves shorter and narrower, branches of cyme patent or reflexed after flowering, corolla and fruit smaller.—VAR. 2, *elonga'tum*, Presl. (sp.); stem thick, branches of cyme not reflexed after flowering, corolla ¼ in. diam., fruit ⅛ in. diam.—VAR. 3, *Witherin'gii*, Sm. (sp.); stem rough with recurved bristles, leaves linear recurved, cyme narrow, its branches short.

4. **G. uligino'sum,** *L.*; stem rough prickly, leaves 6–8 in a whorl aristate, cymes small few-flowered, fruiting pedicels erect.

Marshes and ditches, from Banff and Skye southwards; ascending 1,600 ft. in Northumberland; very rare in Ireland; fl. July–Aug.—Similar in habit and appearance to *G. palustre*, L., but green when dry; leaves 6–8 in a whorl (rarely 4), always narrower, more rigid, mucronate; stem more bristly at the angles; panicle narrower and fruit smaller and granular.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria.

5. **G. saxat'ile,** *L.*; tufted, stem prostrate smooth, leaves usually 6 in a whorl mucronate, cymes small, fruiting pedicels erecto-patent.

Rocks, heaths, &c.; ascends to 3,700 ft. in the Highlands; fl. July–Aug.—Glabrous, black when dry. *Stems* 4–6 in., with many barren shoots, flowering shoots ascending, internodes very short. *Leaves* ⅛–¼ in., obovate or linear-obovate. *Cymes* compact, panicled. *Corolla-lobes* subacute. *Fruit* minute, rough.—DISTRIB. Europe, W. Siberia.

6. **G. sylves'tre,** *Poll.*; diffuse, stem smooth glabrous or pubescent below, leaves 6–8 in a whorl narrow ciliate aristate, cymes much longer than the leaves, fruiting pedicels spreading.

Dry rocky hills and pastures; ascending to 2,400 ft. in Yorkshire; fl. July–Aug.—Very similar to *G. saxatile*, but less tufted, more erect and rigid; leaves narrower, stiffer, awned.—DISTRIB. Europe, except Russia.

VAR. 1, *monta'num*, Vill. (sp.); stem strict glabrous acutely 4-gonous, leaves suddenly acuminate, margins slightly revolute, cymes lax-flowered. *G. pusillum*, Sm. not L.—VAR. 2, *nitid'ulum*, Thuill. (sp.); stem glabrous or hairy below obtusely 4-gonous, leaves narrower, margin strongly revolute, cymes rather compact. *G. commutatum*, Bab. not Jordan.

7. **G. Mollu'go,** *L.*; stem flaccid glabrous or hairy, leaves 6–8 in a whorl, cymes horizontal, corolla-lobes with slender tips.

Hedges and copses throughout England; ascending to 1,000 ft. in Yorkshire; E. of Scotland and of Ireland, very rare; fl. July–Aug.—Pale when dry. *Stem* 1–4 ft., erect or decumbent, angles hairy or scabrid. *Leaves* variable, margins with erect or reversed bristles. *Cymes* large, panicled many-flowered. *Fruit* ⅛ in. diam., black, shagreened.—DISTRIB. Europe (Arctic), Siberia.

Sub-sp. ERECTUM, *Huds.* (sp.); suberect, leaves linear or lanceolate, cyme with slender ascending branches. *G. aristatum*, Sm. not L.

Sub-sp. SCABRUM, *With.* (sp.); decumbent, branches divaricate, leaves obovate-lanceolate, cyme with spreading branches. *G. ela'tum*, Thuill.; *G. insubricum*, Gaud.—VAR. *Bake'ri*, Syme; leaves linear, cyme few-flowered.

*** *Perennial. Flowers white. Fruit hispid.*

8. **G. borea'le,** *L.*; stem erect, leaves 4 in a whorl lanceolate, cymes axillary and terminal many-flowered.

Moist rocks in mountain districts; ascends to 2,800 ft. in the Highlands; fl. June–Aug.—Glabrous or pubescent; blackish when dry. *Rootstock* creeping.

Stems 1–2 ft., tufted, rigid, sparingly branched above. Leaves ½–1½ in., 3-nerved. *Cymes* panicled; branches suberect; bracts ovate. *Flower* ¼ in. diam. *Fruit* ⅓ in. diam., hispid with hooked hairs.—DISTRIB. N. and Mid. Europe (Arctic), N. Asia, Himalaya, E. and W. N. America.

**** *Annual. Flowers white or greenish. Fruit often large, usually hispid or tubercled. Angles of stem and margins of leaves prickly.*

9. **G. Apari'ne,** *L.*; leaves 6–8 in a whorl, cymes axillary 3-9-flowered, pedicels divaricate, fruit large usually hispid. *Goose-grass, Cleavers.*

Hedges and waste places, ascending to 1,200 feet in Yorkshire; fl. June–July. —*Stem* 1–5 ft., weak, straggling, often forming matted masses, very rough. *Leaves* ½–2 in., narrow-lanceolate, usually hispid all over. *Fruit* purplish. —DISTRIB. Europe (Arctic), N. Africa, N. Asia, W. Asia to India, temp. N. and S. America.

Sub-sp. APARI'NE proper; cymes usually 3-flowered, flowers white, fruit tubercled tubercles crowned by hooked bristles.

Sub-sp. VAILLAN'TII, *DC.* (sp.); cymes 3–9-flowered, flowers very minute greenish, fruit hispid with hooked bristles.—Saffron Walden, in fields.

10. **G. tricor'ne,** *With.*, leaves 6–8 in a whorl, cymes axillary 3-flowered, fruit large granulate on recurved pedicels.

Cultivated fields on chalky soil, from Cumberland southwards; absent in Scotland and Ireland; a colonist, *Watson;* fl. June–Oct.—Habit and appearance of *G. Aparine,* but leaves narrower at the tip, and the fruiting pedicels very peculiar.—DISTRIB. Europe from Holland southwards, N. Africa, India.

11. **G. parisien'se,** *L.*; sub-sp. *anglicum,* Huds. (sp.); leaves about 6 in a whorl, cymes axillary and terminal panicled few-flowered, fruit minute tubercled.

Walls, and sandy places in S.E. of England, from Norfolk to Sussex; fl. June–July.—*Stem* diffuse, branched, 6–12 in., without barren shoots. *Leaves* ½–½ in., narrow, mucronate, finally reflexed, margins rough with prickles that point forwards. *Flowers* greenish-white.—DISTRIB. Europe, from Holland southwards, N. Africa.—The typical *G. parisiense* has hispid fruit.

3. ASPER'ULA, *L.*

Herbs or small shrubs. *Leaves* whorled, lower often opposite. *Flowers* in terminal or axillary cymes, small. *Calyx-limb* 4-toothed, deciduous or 0. *Corolla* funnel- or bell-shaped, 4-fid. *Stamens* 4. *Styles* 2, more or less connate, stigmas capitate. *Fruit* dry or rather fleshy.—DISTRIB. Temp. regions; species 50 ?—ETYM. *asper,* from the *rough* hairs of many.

1. **A. odora'ta,** *L.*; upper leaves 7-9, lower 6 in a whorl. *Wood-ruff.*

Shaded hedgebanks, copses, &c.; ascends to 1,200 ft. in Scotland; fl. May–June.—Almost glabrous, odoriferous in drying, shining. *Rootstock* perennial, creeping, often stoloniferous. *Stems* 6–18 in., subsimple, hairy beneath the nodes. *Leaves* 1–1½ in., oblong-lanceolate, cuspidate, ciliate. *Cymes* subterminal, subumbellate. *Corolla-tube* ¼ in. diam., as long as the limb, white, lobes obtuse. *Fruit* small, hispid with hooked hairs.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.

2. **A. cynan chica,** *L.*; leaves 4 in a whorl. *Squinancy-wort.*

Dry banks, local, from Yorkshire and Westmoreland southwards; S. and W. Ireland; fl. June–July.—Glabrous or nearly so, tufted; branches 6–10 in.,

ascending. *Leaves* ¼–1 in., close set, 2 of each whorl much smaller than the others, narrow-linear, mucronate, rigid, recurved, not ciliate. *Cymes* lax-flowered. *Corolla* ⅛ in. diam., pink and papillose externally, white inside. *Fruit* minute, papillose.—DISTRIB. Europe, from Holland southwards; N. Africa, Siberia, W. Asia.

4. SHERAR'DIA, *Dillen.* FIELD-MADDER.

An annual or biennial herb. *Flowers* small, blue or pink, in terminal involucrate heads. *Calyx-limb* 4–6-toothed, persistent. *Corolla* funnel-shaped, tube slender; limb 4-fid. *Stamens* 4, filaments slender. *Style* 2-fid, stigmas capitate. *Fruit* didymous, dry, crowned with the enlarged calyx-limb, separating into 2 plano-convex cocci.—DISTRIB. Europe, N. Africa, Siberia.—ETYM. James Sherard, an eminent botanist.

1. **S. arven'sis,** *L.*; leaves 4–6 in a whorl, lower often opposite.

Fields and waste places; fl. April–Oct.—Hispid. *Stems* 6–18 in., prostrate, spreading from the root. *Leaves* ¼–¾ in., oblong-lanceolate, acute. *Corolla* lilac, ⅛ in. diam.. *Fruit* minute, hispid, crowned by the erect ciliate calyx-teeth.

ORDER XL. **VALERIA'NEÆ.**

Herbs, rarely shrubs. *Leaves* opposite, exstipulate. *Flowers* small, usually irregular, in dichotomous cymes. *Calyx* superior; limb lobed or a feathery pappus, involute in bud. *Corolla* funnel-shaped, tube equal gibbous or spurred at the base; lobes 3–5, unequal, obtuse, imbricate in bud. *Disk* small, epigynous. *Stamens* 1–3 or 5, inserted at the base of the corolla-tube, filaments free slender exserted; anthers versatile. *Ovary-cells* 3, 2 empty or suppressed, 1 with a solitary pendulous anatropous ovule; style simple, filiform, stigma obtuse or 2–3-lobed.—*Fruit* small, indehiscent, coriaceous membranous or woody; cells 1 fertile and 2 small empty or 0, the latter sometimes confluent. *Seed* pendulous, testa membranous, inner coat sometimes thickened, albumen 0; embryo straight, cotyledons oblong, radicle cylindric.—DISTRIB. Europe, N. Africa, temp. Asia and N. and S. America, unknown in Australia, one sp. is S. African; genera 12; species 185.—AFFINITIES. Close with *Dipsaceæ* and *Compositæ*.—PROPERTIES. Aromatic, antispasmodic, sometimes stimulant.

Calyx-limb pappose. Corolla-tube gibbous. Stamens 3.....1. Valeriana.
Calyx-limb pappose. Corolla-tube spurred. Stamen 1. 1*. *Centranthus.*
Calyx-limb toothed or lobed. Corolla-tube obconic.....2. Valerianella.

1. VALERIA'NA, *L.* VALERIAN.

Perennial, rarely annual herbs. *Radical leaves* crowded; cauline opposite or whorled, entire or pinnatifid. *Flowers* in corymbose capitate or panicled cymes, bracteolate. *Calyx-limb* annular, crenulate, developing into a feathery deciduous pappus. *Corolla-tube* obconic or cylindric, equal or gibbous at the base; lobes 5, rarely 3–4, unequal. *Stamens* 3. *Stigma* capitate. *Fruit* compressed, costate, membranous, 1-celled, 1-seeded.—DISTRIB. Temp. Europe, Asia, N. and S. America.—ETYM. *valere*, from its powerful medicinal properties; species about 130.—Flowers sometimes almost dicœcious, the female with very imperfect anthers.

1. **V. dio'ica,** *L.*; cauline leaves pinnatifid, flowers polygamous.

Wet meadows and bogs, local, from Fife and Dumbarton southwards; ascends to near 2,000 ft. in Northumberland; absent from Ireland; fl. May–June.—Glabrous, ciliate at the nodes and leaf-margins. *Rootstock* creeping, stoloniferous. *Stem* 6–18 in., ascending. *Leaves* ½–1 in., radical long-petioled, ovate or spathulate; cauline with a large terminal lobe and narrow lateral segments. *Cymes* terminal, corymbose; flowers ⅛ in. diam., pinkish; females denser, smaller, darker; bracts linear. *Fruit* small.—DISTRIB. Europe.

2. **V. officina'lis,** *L.*; leaves all pinnate. *Cat's Valerian, All-heal.*

Wet meadows and banks of streams; ascends to near 2,500 ft. in the Lake district; fl. June–Aug.—Glabrous or hairy below, fœtid. *Rootstock* short, stoloniferous. *Leaves* radical long-petioled, soon withering; cauline 2–5 in., sessile; leaflets ½–2 in., lanceolate, entire or serrate. *Cymes* terminal and axillary, corymbose. *Flowers* 2-sexual. *Corolla* ⅛ in., pale pink. *Fruit* small, narrow, ovoid.—DISTRIB. Europe (Arctic), Siberia, Dahuria, Japan, W. Asia.—Rootstock a well-known antispasmodic.

VAR. 1, *officina'lis* proper; leaflets 6–10 pairs.—VAR. 2, *sambucifo'lia,* Mikan (sp.); leaflets 4–6 pairs.

V. PYRENA'ICA, *L.*; leaves very large cordate deeply toothed.

Naturalized in plantations; fl. June–July.—A large coarse herb, with no pretensions to be considered indigenous. *Stem* 2–4 ft. *Leaves* often a foot in diam., upper with a few basal leaflets. *Flowers* much as in *V. officinalis.*—DISTRIB. S. of France and Spain.

1*. *CENTRAN'THUS, DC.* SPUR-VALERIAN.

Perennial, glabrous, leafy herbs. *Flowers* in terminal unilateral panicled cymes, bracteolate, red or white. *Calyx-limb* annular, crenulate, developing into a feathery deciduous pappus. *Corolla-tube* compressed, elongate, with a longitudinal septum, spurred at the base; lobes 5, unequal. *Stamen* 1. *Stigma* capitate. *Fruit* membranous, 1-celled, 1-seeded.—DISTRIB. Europe, N. Africa, W. Asia; species about 10.—ETYM. κέντρος and ἄνθος, from the *spurred corolla.*

C. RU'BER, *DC.*; lower leaves lanceolate, upper triangular ovate.

Old walls and chalk-pits, naturalized in the S. of England and Ireland, rarer northwards; fl. June–Sept.—*Stem* woody below; branches 2–3 ft., erect, terete, fistular. *Leaves* 2–4 in., thick; lower 2–3 in., petioled, lanceolate or subspathulate; upper sessile, entire or toothed at the base. *Cymes* long; flowers dense, secund. *Corolla* ½ in., red or white; spur slender. *Fruit* ¼ in., rough, narrow, ovoid, compressed.—DISTRIB. Mid. and S. Europe, N. Africa, W. Asia.

2. VALERIANEL'LA, *Tournef.* CORN SALAD.

Small annuals, dichotomously branched. *Flowers* solitary or cymose in the forks of the branches, small, bracteate. *Calyx-limb* toothed lobed or 0. *Corolla* funnel-shaped, regular, not spurred; lobes 5, obtuse. *Stamens* 3. *Stigma* simple or 3-fid. *Fruit* compressed, unequal-sided, grooved, 2–3-celled, 1-seeded.—DISTRIB. Europe, N. Africa, W. Asia, N. America, species about 50.—ETYM. Diminutive of *Valeriana.*

1. **V. olito'ria,** *Mœnch;* cymes capitate, bracts leafy toothed, fertile

cell of fruit corky on the back, empty ones contiguous or confluent, calyx-limb obsolete. *Valeriana Locusta*, L. in part. *Lamb's Lettuce.*

Cornfields and hedgebanks; a native? *Watson;* fl. April–June.—Glabrous, flaccid, brittle, 6–12 in. *Leaves* 1–3 in., linear-oblong, or oblong-lanceolate, quite entire or toothed, cauline ½-amplexicaul. *Flowers* minute, pale lilac; bracts linear, ciliate. *Fruit* minute, glabrous or hairy.—DISTRIB. Europe, N. Africa, W. Asia; introd. into N. America.—An excellent salad.

V. CARINA'TA, *Loisel;* cymes capitate, fruit oblong boat-shaped, fertile cell not corky, empty cells contiguous inflated, calyx-limb indistinct.

Cultivated ground, &c. from Yorkshire southwards, naturalized; fl. April–June.—Probably a variety of *F. olitoria*, which it resembles in all characters, save those of the fruit given above.—DISTRIB. Europe from Holland southwards, N. Africa, W. Asia.

2. **V. Auric'ula,** *DC.*; cymes lax, fruit broadly ovoid turgid narrowly grooved in front, fertile cell not corky, empty cells contiguous inflated, calyx with one large unilateral lobe. *F. tridentata*, Stev.

Cornfields, rare, from Fife southwards, and in Ireland; a colonist, *Watson;* fl. June–Aug.—Very similar in size, habit, and foliage to *F. olitoria*, but more slender, inflorescence different, and fruit widely so.—DISTRIB. Europe from Holland southwards, W. Asia.

3. **V. denta'ta,** *Poll.*; cymes lax, fruit narrow-ovoid slightly compressed, fertile cell not corky, empty cells remote slender on one side of the fruit, calyx with one large unilateral lobe. *V. Morisonii*, DC.

Cornfields, &c. from Moray and Lanark southwards, and in Ireland; a colonist, *Watson;* fl. June–Aug.—Habit, &c. of *V. Auricula. Flowers* flesh-coloured.—DISTRIB. Europe from Gothland southwards, N. Africa, N.W. India.

VAR. *mix'ta*, Desf. (sp.); fruit hispid. *F. eriocarpa*, R. and S. not Desv.

ORDER XLI. DIPSA'CEÆ.

Perennial or biennial herbs. *Leaves* opposite, rarely whorled, exstipulate. *Flowers* small, capitate; outer bracts involucriform; inner 0 or beneath the flowers; bracteoles forming an involucel embracing the calyx-tube and enclosing the fruit. *Calyx* superior, suddenly expanding into a cup-shaped, entire, lobed, or ciliate limb. *Corolla-tube* funnel-shaped or cylindric, often curved; lobes 4–5, obtuse, imbricate in bud, the larger or anterior overlapping. *Stamens* 4, inserted on the corolla-tube; filaments filiform, free, often unequal, incurved in bud, exserted; anthers versatile. *Ovary* 1-celled; style filiform, stigma simple oblique or notched; ovule solitary, pendulous from the top of the cell, anatropous. *Fruit* indehiscent, surrounded by the hardened and grooved involucel, and often crowned by the calyx-limb. *Seed* pendulous, testa membranous, albumen fleshy; embryo axile, straight, cotyledons broad flat, radicle short.—DISTRIB. Chiefly Oriental; genera 6; species 150.—AFFINITIES. With *Compositæ.*—PROPERTIES unimportant.

Floral bracts spinescent exserted, covering the head .....1. Dipsacus.
Floral bracts concealed, scale-like or 0 .....2. Scabiosa.

1. DIP'SACUS, *Tournef.* TEASEL.

Erect, biennial, hairy or spinulose herbs, with angular stems. *Leaves* usually connate at the base, toothed or cut. *Heads* oblong or cylindric; receptacle columnar; invol. bracts many, rigid, spreading; floral bracts exserted, spinescent; involucel 4-angled. *Calyx-limb* discoid or cupular, lobulate. *Corolla-tube* slightly dilated upwards; lobes 4, short, unequal. *Stamens* 4. *Style* filiform, stigma dilated obliquely decurved.—DISTRIB. Europe, W. Asia; species about 17.—ETYM. obscure.

1. **D. sylves'tris,** *L.*; leaves sessile simple obovate-lanceolate, heads oblong, invol. bracts upcurved. *Wild Teasel.*

Copses and hedges in England and Ireland, rare and local in Scotland; fl. Aug.–Sept.—Glabrous. *Stem* 3–4 ft., stout, rigid, ribs prickly. *Leaves,* radical on the first year's growth only, spreading; cauline 6–8 in., oblong-lanceolate, entire or crenate, midrib prickly. *Heads* 2–3 in.; bracts linear, rigid, longer than the head; floral bracts very long, rigid, subulate, strict, ciliate; involucel pubescent, 4-angled in fruit. *Calyx-limb* deciduous. *Corolla* purplish.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia.—*D. Fullonum,* L. (Fuller's Teasel), known by its hooked bracts, is probably a form of this plant only known in cultivation.

2. **D. pilo'sus,** *L.*; leaves petioled with usually a pair of basal leaflets, heads subglobose hairy, invol. bracts deflexed.

Moist hedges and banks, local, Yorkshire to Hants and Kent; absent from Ireland; fl. Aug.–Sept.—More or less hairy. *Stem* 2–4 ft., slender, ribs with soft, short, hair-pointed prickles. *Leaves,* radical petioled, hairy, crenate; cauline 6–12 in., oblong, crenate-serrate. *Heads* ¾–1 in. diam., drooping in bud; bracts many, shorter than the head, linear, toothed and ciliate; floral bracts obovate, with long cuspidate ciliate points; involucel calyx-tube and corolla white, very hairy.—DISTRIB. Europe from Gothland southwards, W. Asia.

2. SCABIO'SA, *L.*

Perennial herbs. *Leaves* entire or pinnatifid. *Heads* hemispheric or depressed; invol. bracts 1–2 seriate; receptacle hemispheric or columnar, hairy or with scaly floral bracts; outer flowers often larger and rayed. *Calyx-tube* contracted at the top, included in the tubular, 4–8-angled, truncate, or 4–5-lobed involucel; limb cup-shaped, with 4–10 rigid bristles or teeth. *Corolla* curved, oblique or 2-lipped; lobes 4–5, obtuse. *Stamens* 4, exserted. *Style* filiform, stigma capitellate notched.—DISTRIB. Europe, W. Asia, N. and S. and trop. Africa; species about 90.—ETYM. *scabies,* from its use in skin-diseases.

SUB-GEN. **Scabio'sa** proper. *Receptacle* elongate, covered with scaly bracteoles. *Involucel* 8-furrowed. *Calyx-teeth* of 4-5 persistent bristles.

1. **S. succi'sa,** *L.*; leaves entire, involucral bracts shorter than the 4-lobed subequal corollas. *Devil's-bit-Scabious.*

Pastures and open places; ascends to 2,500 ft. in the Highlands; fl. July–Oct.—*Rootstock* short, abruptly truncate. *Stem* 1–2 ft., branched above. *Leaves* glabrous or hairy; radical oblong or obovate, petioled; cauline few, toothed. *Heads* ¾–1½ in. diam.; peduncles with appressed hairs; invol. bracts lanceolate, floral linear-spathulate. *Flowers* blue-purple or white; involucel, villous, with 4 ovate teeth. *Calycine bristles* 4 rigid. *Corolla*

pilose, tube curved. *Anthers* red-brown. *Fruit* oblong, concealed in the involucel.—DISTRIB. Europe (Arctic), Siberia, N. Africa.

2. **S. Columba'ria,** *L.*; cauline leaves pinnatifid, invol. bracts longer than the 5-lobed corollas, outer corollas larger very irregular.

Dry pastures and banks, from E. Scotland and Aberdeen southwards; ascends to 1,600 ft. in Yorkshire; absent from Ireland; fl. July–Sept.—*Rootstock* tufted, often woody. *Stem* 1–2 ft., simple or branched above, pilose. *Leaves* glabrous or pubescent, very variable; radical narrow, petioled, entire or divided; cauline segments often cut. *Heads* 1–1½ in. diam.; peduncles slender; invol. bracts 1-seriate, slender, floral linear-spathulate. *Flowers* lilac or blue-purple; involucel subcampanulate, limb white, membranous, many-nerved. *Calycine bristles* 5, rigid, rough. *Corolla* pubescent, of inner flowers regular, of outer rayed. *Anthers* yellow. *Fruit* narrow-obovoid, shortly beaked.—DISTRIB. Europe, N. Africa.

SUB-GEN. **Knau'tia,** *Coulter* (gen.). *Receptacle* hemispheric, covered with hairs. *Involucel* 4-furrowed. *Calyx-teeth* of 8-16 deciduous bristles.

3. **S. arven'sis,** *L.*; invol. bracts shorter than the usually 4-lobed corollas, of which the outer are much larger and 2-lipped.

Dry banks and fields; fl. July–Sept. *Rootstock* stout. *Stem* 2–5 ft., stout, very hairy, usually branched above. *Leaves* variable, pilose; radical oblong-lanceolate, entire serrate or crenate; cauline toothed lobed or pinnatifid. *Heads* 1–1½ in. diam., depressed; peduncle long, stout; invol. bracts broad, leafy, 2-seriate. *Flowers* pale lilac or blue; involucels villous, obscurely 4-toothed. *Corolla* pilose, inner redder, outer larger, radiating. *Anthers* yellow. *Fruit* ovoid, beaked; calyx-limb deciduous.—DISTRIB. Europe (Arctic), Siberia, N. Africa.

ORDER XLII. COMPOS'ITÆ.

Herbs (the British species). *Leaves* alternate, rarely opposite or whorled, simple or compound; stipules 0. *Inflorescence* a centripetal head of many small flowers, sessile on the dilated top of the peduncle (*receptacle*), enclosed in an involucre of whorled bracts; bracteoles 0, or scales or bristles on the receptacle. *Flowers* all tubular (head *discoid*), or the outer, or all, ligulate (head *rayed*); 2-sexual, or the inner 2-sexual or male, the outer female or neuter. *Calyx* superior; limb 0, or of hairs (*pappus*) or scales. *Corolla* of 2 forms: 1st, tubular, or campanulate, 4–5-lobed, lobes valvate, with marginal nerves; 2dly, ligulate, lobes elongate and connate into a strap-shaped or elliptic ligule. *Disk* epigynous. *Stamens* 4–5, inserted within the corolla-tube, filaments usually free; anthers basi-fixed, usually connate; connective produced upwards; cells simple or tailed at the base; pollen subglobose, rough. *Ovary* 1-celled; style slender 2-fid, arms (sometimes connate) linear, ½-terete, naked or externally pubescent or tipped by pubescent cones, margins stigmatic; ovule solitary, basal erect, anatropous, nucleus with 1 coat. *Fruit* dry, indehiscent. *Seed* erect, testa membranous, albumen 0; embryo straight, cotyledons plano-convex, radicle short.—AFFINITIES. Close with *Dipsaceæ*, *Valerianeæ*, and *Lobeliaceæ*.—DISTRIB. Co-extensive with dicotyledonous

vegetation; genera about 1,000; species about 8,000.—PROPERTIES. Too numerous to mention here.

SERIES 1. TUBULIFLO'REÆ. *Flowers all tubular or the outer only ligulate. Juice watery.*

TRIBE I. **CYNA'REÆ.** *Leaves* alternate, usually spinous-toothed. *Involucre* often globose, bracts spinous. *Flowers* all tubular, 2-sexual, or the outer female or neuter (diœcious in *Serratula* and some *Cardui*), tube slender, ventricose above, lobes very narrow. *Anthers* much exserted; connective elongate, stiff. *Style-arms* usually combined into a pubescent 2-fid cylinder, with a ring of hairs or swelling at their base.

Anther-cells tailed.
- Outer bracts hooked ..... 1. Arctium.
- Outer bracts spinous, inner spreading ..... 2. Carlina.
- Bracts all unarmed ..... 3. Saussurea.

Anther-cells not tailed or scarcely so.
- Pappus short unequal or 0. ..... 4. Centaurea.
- Pappus-hairs long.
  - Bracts unarmed ..... 5. Serratula.
  - Bracts spinescent. Fruit compressed ..... 6. Carduus.
  - Bracts spinescent. Fruit 4-angled and ribbed ..... 7. Onopordon.

TRIBE II. **EUPATO'RIEÆ.** *Leaves* mostly opposite. *Flowers* all tubular, 2-sexual. *Anther-cells* not tailed. *Style-arms* slender, ½-terete, pubescent, stigmatic lines not continued to the base. ..... 8. Eupatorium.

TRIBE III. **TUSSILAG'INEÆ.** *Leaves* alternate, all radical, broad. *Outer flowers* female, very slender and tubular, or ligulate. *Disk flowers* tubular, usually 2-sexual. *Anther-cells* not tailed. *Style-arms* connate, pubescent, with 2-fid conical tips.
- Heads racemose; outer flowers tubular ..... 9. Petasites.
- Heads solitary; outer flowers ligulate ..... 10. Tussilago.

TRIBE IV. **ASTEROI'DEÆ.** *Leaves* alternate. *Ray-flowers* female or neuter, ligulate (tubular in *Linosyris*); style-arms linear, obtuse, glabrous, stigmatic lines confluent. *Disk-flowers* 2-sexual; anther-cells not tailed; style-arms linear, glabrous, tipped with a pubescent cone. *Pappus-hairs* or scales rigid or 0.
- Ray-flowers purple, 1-seriate. Pappus rigid ..... 11. Aster.
- Ray-flowers in 2 or more series. Pappus-hairs rigid ..... 12. Erigeron.
- Ray-flowers white or pink. Pappus 0 ..... 13. Bellis.
- Ray-flowers yellow. Pappus-hairs rigid ..... 14. Solidago.
- Ray-flowers 0. Pappus-hairs rigid ..... 15. Linosyris.

TRIBE V. **I'NULEÆ.** *Leaves* alternate. *Ray-flowers* ligulate, yellow; disk-flowers tubular; anther-cells with slender tails. *Style-arms* and *pappus* as in *Asteroideæ* ..... 16. Inula.

TRIBE VI. **HELIAN'THEÆ.** *Leaves* opposite. *Ray-flowers* 0 or ligulate, yellow, female or neuter. *Disk-flowers* 2-sexual. *Style-arms* as in *Asteroideæ*.
- Pappus of 2 barbed bristles ..... 17. Bidens.
- Pappus of broad ciliate scales ..... 17*. *Galinsoga.*

TRIBE VII. **ANTHE'MIDEÆ.** *Leaves* alternate. *Ray-flowers* ligulate, or tubular and very slender. *Anther-cells* not tailed. *Style-arms* linear, with truncate papillose or penicillate tips; stigmatic margins confluent below. *Pappus* 0 or minute.

Outer flowers ligulate, white or 0. *Receptacle with scaly or bristly bracteoles.*
Ligule oblong. Fruit terete or angled.....18. Anthemis.
Ligule broad, short. Fruit compressed, winged.....19. Achillea.
Flowers all tubular and compressed.....20. Diotis.

Outer flowers ligulate, white or yellow. Receptacle naked.
Receptacle conic, often elongating.....21. Matricaria.
Receptacle flat or convex.....22. Chrysanthemum.

Flowers all tubular. Receptacle naked.
Receptacle broad. Epigynous disk broad.....23. Tanacetum.
Receptacle narrow. Epigynous disk small.....24. Artomisia.

TRIBE VIII. **GNAPHA'LIEÆ.** *Leaves* alternate, quite entire. *Involucral bracts* scarious. *Flowers* all tubular, outer excessively slender, female. *Anther-cells* with filiform tails. *Style-arms* linear, truncate or obtuse, tips papillose. *Pappus-hairs* very slender, silky.

Heads 2-sexual. Receptacle flat, naked.....25. Gnaphalium.
Heads almost diœcious. Pappus of male clavate .....26. Antennaria.
Heads 2-sexual. Receptacle conical; bracteoles few .....27. Filago.

TRIBE IX. **SENECION'IDEÆ.** *Leaves* alternate. *Flowers* all yellow, tubular and 2-sexual, or outer ligulate. *Receptacle* naked. *Anther-cells* without tails. *Style-arms* as in *Gnaphalieæ*, but sometimes tipped with short papillose cones (as in *Asteroideæ*). *Pappus-hairs* usually very soft (rigid in *Doronicum*).

Involucral bracts in many series.....27*. *Doronicum*.
Involucral bracts in one series.....28. Senecio.

SERIES 2. LIGULIFLO'RÆ. *Flowers all ligulate. Juice milky.*

TRIBE X. **CICHORA'CEÆ.** *Leaves* alternate. *Style* cylindric, pubescent above; arms linear, ½-terete, obtuse, pubescent at the back; stigmatic lines not confluent.

Pappus 0.....29. Lapsana.
Pappus a coriaceous raised border .....30. Arnoseris.
Pappus of short broad scales.....31. Cichorium.
Pappus of inner fruits of feathery hairs, often dilated at the base.
* Receptacle covered with narrow bracteoles .....32. Hypochœris.
** Receptacle naked.

Fruit with a long slender beak.
Leaves toothed. Outer involucral bracts cordate.....33. Helminthia.
Leaves quite entire. Involucral bracts narrow.....34. Tragopogon.

Fruit with a short beak.
Involucral bracts 1-seriate, with a few outer short ones.....35. Picris.
Involucral bracts 2–3 seriate.....36. Leontodon.

Pappus of simple hairs not dilated at the base.
* Pappus-hairs white, silky (except *Crepis paludosa*).

Fruit with a long slender beak.
Fruit compressed, not muricate. Leafy branched herbs.....37. Lactuca.
Fruit muricate upwards. Scapigerous herbs.....38. Taraxacum.
Fruit terete, not muricate.....39. Crepis, sect. *Barkhausia*.

Fruit with a short thick beak or 0.
Fruit angled or terete, much compressed .....40. Sonchus.

** Pappus-hairs rigid, discoloured (see *Crepis paludosa* in *).
Fruit compressed. Pappus-hairs in several series.....41. Mulgedium.
Fruit terete. Pappus-hairs in one series.....42. Hieracium.

1. ARC'TIUM, *L.* BURDOCK.

A stout, erect, branching, biennial herb. *Leaves* alternate, the lower very large. *Heads* solitary racemed or corymbose, not rayed, purple or white; involucre globose, bracts imbricate, very many, coriaceous, appressed below, with long, stiff, spreading, hooked tips; receptacle flat; bracteoles rigid, subulate. *Corollas* regular, campanulate; lobes 5, slender. *Filaments* papillose; anthers with a long terminal appendage, cells with subulate tails. *Style-arms* connate, pubescent below, obtuse. *Fruit* large, oblong or obovoid, laterally compressed, transversely wrinkled, areolate at the base; pappus-hairs multi-seriate, short, free, filiform, scabrid.—DISTRIB. Europe, N. and W. Asia; introd. into N. America.—ETYM. ἄρκτος, *a bear*, from its coarse appearance.

1. **A. Lap'pa,** *L.*; leaves ovate-cordate entire or sinnate-toothed.

Waste places; fl. July–Aug.—Glabrous or cottony, 2–4 ft., very variable. *Leaves* often 1 ft., glabrous above, usually densely cottony beneath. *Heads* ¾–1¼ in. diam., webbed or not; peduncle very stout; invol. bracts slender, angled, rigid, spreading. *Corolla* and stamens purple, styles white. *Fruit* compressed, angled, ribbed, grey mottled with black.—Young stalks formerly eaten boiled, and as salad.—The following sub-species and varieties present no constant characters; I have followed Syme in their discrimination.

Sub-sp. LAP'PA proper (sp.); petioles hollow, heads subcorymbose globose glabrous all green, corolla-tube longer than the limb. *A. majus,* Schkuhr.—From Lancaster and Derby southwards.

Sub-sp. MI'NUS, *Schkuhr* (sp.); heads subracemose more ovoid glabrous or cottony, inner invol. bracts purplish, corolla-tube as long as the limb.—Advances North to Skye.—VAR. 1, *mi'nus* proper; root-leaves coarsely toothed, petioles hollow, heads ½–¾ in. diam. subsessile cottony. Common.—VAR. 2, *interme'dium,* Lange (sp.); root-leaves crenate, petioles with a slender tube, heads arachnoid, lower ones ¾–1 in. diam., of the raceme peduncled purple. *A. pubens,* Bab.—VAR. 3, *nemoro'sum,* Lej. (sp.); root-leaves narrower coarsely crenate, crenatures apiculate, heads subsessile globose.

2. CARLI'NA, *L.* CARLINE-THISTLE.

Rigid, spinous herbs. *Leaves* pinnatifid. *Outer invol. bracts* leafy, spinous-toothed, spreading; inner longer, narrower, scarious, coloured, shining; receptacle flat, deeply pitted, edges of the pits scaly. *Corollas* all tubular, glabrous, erect; limb campanulate, 5-toothed. *Filaments* glabrous; anthers with a terminal appendage, cells with short plumose tails. *Style-arms* connate into a pubescent cone. *Fruit* oblong, terete, silky with 2-fid hairs; pappus-hairs 1-seriate, feathery, connate in threes or fours at the base.—DISTRIB. Europe, N. and S. Africa, W. Asia; species about 15.—ETYM. After Charlemagne, who used it medicinally.

1. **C. vulgar'is,** *L.*; heads 2 or more, bracts ciliate.

Dry fields and pastures; from Arran to Elgin southwards; ascends to 1,200 ft. in Northumberland; local in Ireland; fl. June–Oct.—Biennial, hoary

root tapering. *Stem* 6–18 in., stout, simple or branched above, purple. *Radical leaves* 3–5 in., spreading, lanceolate, pinnatifid, spinous, cottony beneath; cauline many, shorter, ½-amplexicaul. *Heads* ¾–1½ in. diam.; outer bracts cottony, spreading; middle purplish; inner ½ in., narrow, rigid, acute, yellow, spreading, erect when moist. *Bristles* of receptacle rigid, yellow, longer than the soft pappus. *Flowers* purple. *Fruit* brown.—DISTRIB. Europe, Siberia.

3. SAUSSU'REA. *DC.*

Herbs. *Leaves* entire or divided. *Heads* corymbose, purple or violet; invol. bracts multi-seriate, imbricate, obtuse or acute; receptacle flat, covered with chaffy bracteoles. *Corollas* all tubular, ventricose above, 5-fid. *Filaments* glabrous; anthers terminated by a long acute appendage, cells with ciliate tails. *Style-arms* connate below, pubescent, with a ring of hairs at the base. *Fruit* glabrous; pappus-hairs 2-seriate, outer filiform, rough, usually persistent; inner feathery, connate at the base, deciduous.—DISTRIB. N. temp. regions; species about 45.—ETYM. *De Saussure*, the Swiss philosopher.

1. **S. alpi'na,** *L.*; leaves oblong-lanceolate toothed cottony beneath.

Alpine rocks, N. Wales, Lake district, Dumfriesshire, and the Scotch Highlands, ascending to near 4,000 ft.; Mts. of Kerry in Ireland; fl. August.—*Root-stock* short, stoloniferous. *Stem* 6–8 in., stout, erect, leafy, simple, cottony. *Leaves*, lower petioled, 4–7 in., acuminate; upper smaller, sessile. *Heads* 2–3 in., in dense corymbs; involucre ovoid, bracts oblong, obtuse, woolly, inner longer. *Flowers* exserted, purple, anthers bluish. *Fruit* brown, ribbed; pappus dirty white.—DISTRIB. Scandinavia (Arctic), N. Russia, and Alps of Mid. Europe, N. Asia, E. and W. N. America (a form).

4. CENTAU'REA, *L.* KNAPWEED.

Herbs of various habit. *Leaves* entire or cut, often spinous-toothed. *Involucre* ovoid or globose; bracts appressed, imbricate, entire and scarious, or spinous, or dilated fringed or toothed; receptacle flattish; bracteoles bristly. *Corollas* all tubular, oblique or 2-lipped, ventricose above; outer usually larger, neuter, inner 2-sexual; lobes 5, slender. *Filaments* glandular; anthers with a long terminal coriaceous appendage, cells tailed or not. *Fruit* compressed, basal areole oblique, top broad; pappus-hairs short, slender, scabrid, usually in many series, inner smaller often scaly, rarely 0.—DISTRIB. Europe, W. Asia, N. Africa; species 200.—ETYM. Mythical.

SECTION 1. **Ja'cea.** *Invol. bracts* with a dilated broad appendage.

1. **C. ni'gra,** *L.*; leaves hispidulous lanceolate entire or distantly lobed, peduncles leafy, pappus-scales short unequal or 0. *Knapweed.*

Meadows and pastures, ascending to 1,600 ft. in Northumberland; fl. June–Sept.—Perennial. *Stem* ½–3 ft., slender, grooved, simple or branched. *Leaves* scattered, variable, lower petioled, uppermost quite entire. *Heads* 1–1½ in. diam.; invol. appendage very variable, pale or dark brown, orbicular, pectinate on the margin or to the axis. *Flowers* purple, outer often larger. *Fruit* grey.—DISTRIB. Europe; introd. in N. America.

VAR. 1, *ni'gra* proper; outer flowers larger, peduncles thickened, appendages dark brown deeply pectinate.—VAR. 2, *decip'iens*, Thuill.; outer flowers usually larger, peduncles slender, appendages paler less deeply pectinate. *C. nigres'cens*, Bab. Southern counties.

SECTION 2. **Cya'nus.** *Invol. bracts* with the upper part and margins scarious and pectinate or ciliate.

2. **C. Scabio'sa,** *L.*; erect, leaves deeply pinnatifid segments entire or lobed, peduncles glabrous, involucre globose, bracts with brown pectinate tip and margins, pappus as long as the fruit.

Dry pastures and waste places, from Moray southwards, and in Ireland; fl. July–Sept.—*Rootstock* woody. *Stem* 2–3 ft., grooved, sparingly branched, pilose with soft hairs. *Leaves* 4–10 in., almost pinnate, segments obovate. *Heads* 1½–2 in. diam., rayed; invol. bracts with a broad brown tip which is decurrent on the sides of the bracts; flowers bright purple. *Fruit* grey, pubescent.—DISTRIB. Europe, Siberia.

3. **C. Cya'nus,** *L.*; erect, leaves narrow entire or lobes few spreading, peduncles cottony, involucre ovoid, margins of bracts deeply toothed scarious, pappus shorter than the fruit. *Bluebottle, Cornflower.*

Cultivated fields, from Moray and Renfrew southwards; ascending to 1,000 ft. in the Highlands; a colonist, *Watson.;* fl. June–Sept.—Annual or biennial. *Stem* 1–2 ft., slender, grooved, sparingly branched. *Leaves* 2–4 in., variable, sessile, acute, lower ½–1 in., upper $\frac{1}{10}$ in. broad. *Heads* ½–1 in. diam., cobwebby; teeth of bracts triangular, spreading, of outer white, of inner brown and white; bristles of receptacle silvery. *Flowers* of ray few, large, bright blue; of disk smaller, purplish. *Fruit* grey, silky; pappus dirty white.—DISTRIB. Europe, W. Siberia, N.W. India; introd. in N. America.

SECTION 3. **Serid'ia.** *Invol. bracts* tipped by spreading reflexed spines.

4. **C. aspʻera,** *L.*; ascending, leaves linear-oblong entire toothed or lyrate, peduncles leafy, involucre globose, bracts tipped with 5 palmately spreading reflexed spines, pappus shorter than the fruit. *C. Isnardi,* L.

Vazon Bay, Guernsey, very rare; fl. July–Sept.—Perennial. *Stem* 1–2 ft., slender; branches spreading, sparsely pubescent, tips cottony. *Leaves* very variable, lower sessile or petioled, lanceolate or oblong. *Heads* 1 in. diam.; bracts coriaceous, yellow-brown; spines $\frac{1}{12}$–$\frac{1}{8}$ in.; bristles of receptacle white. *Fruit* grey, pubescent; pappus white.—DISTRIB. France and S. Europe.

SECTION 4. **Calcit'rapa.** *Invol. bracts* ending in a long strong spine.

5. **C. Calcit'rapa,** *L.*; rigid, diffusely branched from beneath the heads, leaves pinnatifid, lobes recurved aristate, spines of bracts long spreading, with a few smaller on each side the base, pappus 0. *Star-Thistle.*

Dry waste places, rare, from Norfolk and S. Wales to Cornwall and Somerset; a native? *Watson;* fl. July–Sept.—Biennial, 1–2 ft., cottony or glabrous; branches leafy, spreading, stout. *Leaves* 1–3 in., often interruptedly pinnatifid, lobes distant, slender. *Heads* lateral and sessile, or terminating leafy branches, ⅛ in. diam., spines as long, yellow and channelled above. *Flowers* rose-purple. *Fruit* white or mottled brown.—DISTRIB. Europe from Holland southward, N. Africa, N.W. India; introd. in N. America.

C. SOLSTITIA'LIS, *L.*; erect, branched, cottony, stems winged, lower leaves lyrate, upper linear entire decurrent, spines of upper bracts long spreading with a few smaller ones at the base, pappus soft.

Fields in E. and S. of England, rare; introd. with lucern, &c.; fl. July–Sept.—Annual, much branched, 1–2 ft. *Stem* rigid, branches twiggy, terminated

by peduncled heads. *Leaves* very variable. *Heads* globose, ½ in. diam., spines as long, not channelled, those of the outer bracts very small. *Flowers* yellow. *Fruit* white; pappus copious, white, as long as the fruit.—DISTRIB. Europe from Holland southwards, Siberia.

5. SERRATU'LA, *DC.* SAW-WORT.

Perennial herbs. *Leaves* alternate; radical simple; cauline usually pinnatifid. *Heads* solitary or corymbose, sometimes dicœcious, purple or white; invol. bracts many, imbricate, outer shorter, inner more or less scarious at the tip; receptacle bracteolate. *Corollas* regular, tubular, limb ventricose, lobes 5, narrow, oblique. *Filaments* papillose; anther-cells simple or shortly tailed. *Style* tumid or papillose or with a ring of hairs at the tip; arms free or connate. *Fruit* oblong, compressed, glabrous, smooth; pappus-hairs multi-seriate, rigid, scabrid, coloured, outer shorter, deciduous.—DISTRIB. Europe, Asia; N. America; species about 30.—ETYM. *serrula*, from the *serrate* foliage.

1. **S. tincto'ria,** *L.*; leaves lyrate-pinnatifid, lobes distant serrate.

Copses, &c. from the N. of England, ascending to near 1,000 ft., southwards; doubtfully indigenous in Scotland; absent from Ireland; fl. Aug.—Glabrous or nearly so. *Stem* 2–3 ft., slender, erect, grooved, leafy, corymbosely branched. *Leaves* 5–9 in., rarely entire; lobes linear-oblong, acute or acuminate; cauline sessile. *Heads* ½–¾ in., corymbose, subsessile in var. *monticola* (Boreau sp.), cylindric-ovoid, subdicœcious, female largest; invol. bracts ciliate, rigid, striate; outer oblong or ovate, acute; inner linear-oblong, purplish. *Flowers* red-purple; male with blue anthers and contiguous style-arms; female with white anthers and spreading style-arms. *Fruit* grey, glabrous; pappus dirty white.—DISTRIB. Europe, W. Siberia.

6. CAR'DUUS, *L.* THISTLE.

Erect herbs. *Leaves* usually spinous-toothed. *Heads* sometimes dicœcious, purple, rarely white; involucre ovoid or globose; bracts many, imbricated, appressed, narrow, rigid, acuminate or spinous-tipped; receptacle deeply pitted, covered with bristly bracteoles. *Corollas* all tubular, tube short, ventricose above, oblique; lobes 5, narrow, elongate. *Filaments* free or connate, pilose or glandular; anthers terminated by a linear appendage, cells usually with toothed tails. *Style-arms* connate into a cylindrical 2-fid pubescent column, with a ring of hairs at the base. *Fruit* oblong, compressed or terete, glabrous; pappus-hairs multi-seriate, filiform, scabrid or feathery, connate at the base, deciduous.—DISTRIB. Chiefly Europe and W. Asia; species about 150.—ETYM. doubtful.

SUB-GEN. 1. **Car'duus** proper. *Filaments free*, pilose. *Fruit* compressed, smooth; pappus-hairs rough not feathery, copious, white, shining. *Leaves* decurrent, wings of stem very spinous.

1. **C. nu'tans,** *L.*; wings of stem interrupted, head large solitary hemispheric drooping, invol. bracts subulate-lanceolate, outer spreading and reflexed. *Musk-Thistle.*

Waste places, from Skye and Moray southwards; ascending to 1,600 ft. in Yorkshire; rare in Scotland and Ireland; fl. July–Sept.—Biennial, rarely branched, more or less cottony. *Stem* 1–3 ft., grooved; wing sinuous, very

spiny. *Leaves* 6–12 in., variable, undulate, entire or 1–2 pinnatifid. *Heads* 1–2 in. diam.; peduncle slender, and involucre cottony; outer bracts ⅔ in., green, spinous tip long. *Flowers* crimson. *Fruit* pale brown, glabrous, granulate.—DISTRIB. Europe, N. Africa, Siberia; introd. in N. America.

2. **C. cris'pus,** *L.*; wings continuous, heads small erect fascicled, peduncles leafy, involucre webbed, bracts erect very slender. *C. acanthoides,* Sm.

Hedgebanks and waste places, from Moray and Dumbarton southwards; ascending to near 1,000 ft. in Yorkshire; rare in Scotland; S. of Ireland; fl. June–Aug.—Annual or biennial. *Stem* 1–3 ft., erect, cottony or pubescent above; branches ascending; wings narrow, waved. *Leaves* variable, cottony below, usually pinnatifid; lobes broad, lobulate. *Heads* variable, ½–⅔ in. diam.; involucre ovoid, bracts subulate, webbed. *Flowers* purple or white. *Fruit* pale, shining, furrowed.—DISTRIB. Europe (Arctic), Siberia, Dahuria, N.W. Himalaya.—A hybrid with *nutans* occurs at Saffron Walden. VAR. 1, *cris'pus* proper; leaves hoary beneath, heads crowded, involucre subglobose.—VAR. 2, *polyan'themos,* Koch (sp.); leaves pubescent on the nerves only, heads crowded, involucre ovoid.—VAR. 3, *litigio'sus,* Gr. and Godr.; leaves as in VAR. 2, heads subsolitary, involucre as in VAR. 1.

3. **C. pycnoceph'alus,** *Jacq.*; wings of stem continuous, heads small fascicled, involucre glabrous narrow, bracts broadly subulate-lanceolate with recurved spines. *C. tenuiflorus,* Curtis.

Sandy waste places, especially on the coast, from Forfar southwards; rare in W. Scotland, common in Ireland.—Annual or biennial, erect, 1–4 ft., branched, hoary. *Leaves* oblong-lanceolate, pinnatifid; lobes broad, sinuate-toothed. *Heads* ¾–1 in., sessile; invol. bracts few. *Flowers* pale purple. *Fruit* grey, shining, minutely pitted, not furrowed.—DISTRIB. Europe, from Denmark southwards; N. Africa.—*C. tenuiflorus* is hardly distinguished from *C. pycnocephalus* by its usually more numerous and smaller heads and outer invol. bracts with a narrow scarious border.

SUB-GEN. 2. **Cirs'ium,** *Tourn.* (gen.). *Filaments* free. *Fruit* compressed, smooth; pappus-hairs feathery, very slender, white. CNICUS, *L.*

* Upper surface of leaves scabrid. Flowers 2-sexual.

4. **C. lanceola'tus,** *L.*; stem winged, leaves pinnatifid, heads fascicled, involucre ovoid cottony, bracts lanceolate spreading. *Spear-thistle.*

Waste places, &c.; fl. July–Oct.—Stout, erect, annual or biennial, 2–5 ft. *Leaves* ½–1 ft., obovate-lanceolate, setose above, cottony below; lobes few, large, 2-fid, toothed, with long stout spines. *Heads* ¾–1½ in. diam., few, erect; peduncle short; invol. bracts very many, subulate, midrib strong, spines long. *Flowers* purple. *Fruit* striped, smooth, shining.—DISTRIB. Europe, N. Africa, Siberia; introd. in N. America.

5. **C. erioph'orus,** *L.*; stem not winged, leaves pinnate, head very large woolly, involucre globose, bracts ciliated, spine slender recurved.

Waste grounds in dry soil, local, from Lancaster and Durham southwards; absent from Ireland; fl. July–Sept.—Tall, stout, handsome, woolly, biennial, 3–5 ft., branched above. *Leaves* 1–2 ft., copiously setose above and cottony beneath; lobes distant, slender, usually 2-partite, the divisions spreading upwards and downwards, margins ciliate and spinous. *Heads* 2–3 in. diam.; invol. bracts very many. *Flowers* pale purple, anthers blue. *Fruit* shining,

smooth, mottled.—DISTRIB. Europe from Holland southwards, W. Asia.—Young parts eatable as salad, and cooked.

** Upper surface of leaves hairy or pubescent.

† *Stem branched, very leafy, or* 0. *Leaves harsh, rigidly spinous.*

6. **C. acau'lis,** *L.*; stem usually very short, leaves pinnatifid, segments 3–4-lobed, heads sessile or on naked peduncles, involucre ovoid glabrous, bracts appressed ciliate mucronate.

Gravelly and chalky pastures in England, from Chester and Lincoln southwards; fl. July–Sept.—Perennial, glabrous or pilose; usually stemless with one subsessile head, rarely elongate with a leafy branched stem, 8–18 in., and several peduncled heads. *Leaves* sessile or petioled, oblong-lanceolate, rigid, very spinous. *Heads* 1–2 in.; involucre ovoid in flower, campanulate in fruit; bracts ovate-lanceolate, mucronate; inner very long, linear. *Flowers* crimson. *Fruit* smooth, glabrous, brown; pappus dirty white.—DISTRIB. Europe from Gothland southwards (excl. Greece and Turkey), Siberia, Dahuria, W. Asia.—A troublesome weed in pastures.

7. **C. arven'sis,** *Curtis;* erect, dicecious, rootstock creeping, leaves pinnatifid, heads many, male involucre subglobose, female ovoid, outer bracts with short spreading spines, inner acuminate.

Fields and waste places, &c., ascending to near 2,000 ft. in Northumberland; fl. July–Sept.—Perennial, very spinous, 2–4 ft.; male and female plants in separate, large patches. *Stem* angled and grooved, more or less cottony, rarely glabrous. *Leaves* oblong-lanceolate, lower petioled, upper slightly decurrent, sinuate lobed or pinnatifid, setose or spinous. *Heads* ½–1 in. diam., corymbose; peduncle short; involucre ½–¾ in., bracts appressed, ciliate, tips rigid spinous; inner obtuse, tips toothed. *Flowers* dingy purple. *Fruit* smooth, shining; pappus dirty white.—DISTRIB. Europe, Siberia, W. Asia to India, N. Africa; introd. in N. America.—The commonest pest of agriculture. A hybrid occurs between this and *C. acaulis.*

Sub-sp. ARVEN'SIS proper; stem flexuous, leaves pinnatifid very spinous, upper ½-amplexicaul.

Sub-sp. SETO'SUS, *Bieb.* (sp.); stem more simple and strict, leaves sessile oblong-lanceolate obtuse sinuate-lobed or subpinnatifid, margins setose.—Orkney, Fife, &c.; very rare, and supposed to be introduced.

8. **C. palus'tris,** *L.*; stem winged, leaves decurrent pinnatifid, lobes 2–3-fid, segments acuminate spinescent, heads in leafy clusters, involucre cottony, bracts appressed, outer mucronate, inner acuminate.

Wet meadows, ditches, &c., ascending to 2,400 ft. in the Highlands; fl. July–Sept.—Biennial, soft, stout, erect, 2–4 ft., branched, very spinous. *Leaves* very decurrent, hairy on both surfaces; lobes narrow. *Heads* ¾ in. diam.; involucre ½ in., ovoid, bracts purplish-green. *Flowers* dark purple. *Fruit* pale, narrow, smooth; pappus dirty white.—DISTRIB. Europe (Arctic), Siberia.—Stalks formerly eaten. A hybrid between this and *C. pratensis* (*C. Forsteri,* Sm.) is found in bogs in Kent, Surrey, and Sussex.

†† *Stem usually simple, not winged. Leaves soft, spines few. Heads* 1 *or few.*

9. **C. praten'sis,** *Hudson;* cottony, rootstock stoloniferous, roots fibrous, leaves lanceolate sinuate-toothed or subpinnatifid, heads usually solitary, involucre hemispherical. *Cirsium anglicum,* Lamk.

Wet meadows, rare, from York (ascending to 1,200 ft.) and N. Wales southwards, and in Ireland; fl. June–Aug.—Perennial. *Stem* 10–18 in., terete, cottony. *Leaves* few, 6–10 in., lower long-petioled, lobes angled not deep or long; upper ½-amplexicaul, auricled. *Heads* 1–1½ in., pedunculed; involucre cottony; bracts appressed, outer mucronate, inner slender purple acuminate. *Flowers* dark purple. *Fruit* pale, slender, smooth; pappus dirty white.—DISTRIB. Holland, Spain, France, and Germany.—*C. Woodwardi*, Watson, is, according to Syme, probably a hybrid between *acaulis* and *pratensis*; it has been found in Wilts and Glamorganshire.

10. **C. tubero'sus,** *L.*; rootstock not stoloniferous, roots fusiform tuberous, leaves deeply pinnatifid, lobes remote narrow 2–4 cleft, heads 1–3, involucre ovoid depressed at the base.

Meadows, Boyton, Wilts, and near Swindon; fl. Aug.–Sept.—Very closely allied to *C. pratensis*, and perhaps only a sub-species of it.—DISTRIB. Europe, from France and Germany southwards.

11. **C. heterophyl'lus,** *L.*; rootstock stoloniferous, roots fibrous, leaves lanceolate serrulate ciliate white beneath, upper entire or pinnatifid, heads few large depressed at the base. *Melancholy Thistle.*

Subalpine pastures and rivulets, from Skye and Ross southwards to Glamorgan and Derby; ascending to 2,700 ft. in the Highlands; absent from Ireland; fl. July–Sept.—*Rootstock* creeping. *Stem* 2–3 ft., white, cottony, terete, furrowed. *Leaves* soft, radical long-petioled, 8–18 in.; upper often ovate, ½-amplexicaul, cordate at the base. *Heads* 1½–2 in. diam.; involucre ovoid, bracts finely pubescent, appressed, outer mucronate, inner linear. *Flowers* red-purple. *Fruit* smooth, small, brown; pappus-hairs brownish-white.—DISTRIB. Europe (Arctic), except Spain Greece and Turkey, Siberia, Dahuria.—*C. Carolorum*, Jenner, is a hybrid with *C. palustris*.

SUB-GEN. 3. **Sil'ybum,** *Gærtn.* (gen.). *Filaments* glandular, connate. *Fruit* terete, rugose; pappus-hairs silky, connate at the base.

C. MARIA'NUS, *Gærtn.*; leaves sinuate or pinnatifid, nerves white.

Waste places near gardens, &c., not indigenous; rare in Scotland and Ireland; fl. July–Sept.—Glabrous, erect, annual or biennial, shining *Stem*, 1–4 ft. grooved, not winged. *Leaves* large, spines strong, stout. *Heads* globose, 1–2 in. diam.; invol. bracts coriaceous, closely appressed, very broad, with one very stout recurved, terminal, subulate spine ½–¾ in., and several shorter ones at its base, outermost merely spinous-toothed, mucronate; receptacle fleshy, hairy, not pitted. *Flowers* rose-purple. *Fruit* ¼ in., oblong, transversely wrinkled, black or grey; pappus white.—DISTRIB. Europe, from Holland southwards.—Stalks formerly eaten.

7. ONOPOR'DON, *L.* COTTON THISTLE.

Tall, erect, branched herbs. *Stems* broadly winged. *Leaves* alternate, decurrent, spinous-toothed. *Heads* large, purple, rarely white; involucre subglobose; bracts very many, imbricate, coriaceous, spinescent; receptacle fleshy, pitted, edges of the pits membranous toothed. *Corollas* all tubular, ventricose above; lobes 5, long, slender. *Filaments* nearly glabrous; anthers with a terminal appendage, cells shortly tailed. *Style-arms* connate into a 2-fid cylinder, with a ring of hairs at the base. *Fruit* obovoid, compressed, 4-ribbed, rugose; pappus-hairs multi-seriate, filiform or flat-

tened, barbed or toothed, connate at the base.—DISTRIB. S. Europe, W. Asia, N. Africa; species 20.—ETYM. The old Greek name.

1. **O. Acan'thium,** *L.*; leaves sinuate-pinnatifid woolly.

Waste dry places, from Chester and Lincoln southwards; an alien or denizen, *Watson*; fl. July–Sept.—A stout, hoary or cottony biennial, 2–5 ft. *Stem* spinous-winged to the top. *Leaves* decurrent, toothed and strongly spinous. *Head* 1½–2 in. diam.; involucre much contracted at the mouth, very cob-webby; bracts subulate, spinescent, recurved, green. *Flowers* pale purple. *Fruit* ¼ in., mottled grey; pappus-hairs white.—DISTRIB. Europe, Siberia; introd. in N. America.

8. EUPATORIUM, *L.* HEMP AGRIMONY.

Herbs or undershrubs. *Leaves* usually opposite. *Heads* few-flowered, white or purplish, in terminal corymbs; invol. bracts imbricate, 2–3-seriate; receptacle flat, naked. *Flowers* few, all tubular, 2-sexual, 5-fid. *Anther-cells* without tails. *Style-arms* long, exserted, cylindric, obtuse, grooved in front, pubescent all over. *Fruit* angular or striate; pappus-hairs 1-seriate, pilose or scabrous.—DISTRIB. Chiefly trop. and temp. American, rarer in the Old World; species about 300.—ETYM. The classical name.

1. **E. cannabi'num,** *L.*; leaves 3–5-foliolate, leaflets lanceolate serrate.

River-banks and moist places; fl. July–Sept.—Pubescent, perennial, woody below. *Stem* 2–4 ft., subsimple, terete; branches short. *Leaves* opposite; radical petioled, obovate-lanceolate; cauline subsessile; leaflets 2–4 in., lanceolate, coarsely serrate. *Heads* in dense terminal 5–6-flowered corymbs, whitish or pale purple; invol. bracts about 10, ¼ in., scarious, linear-oblong, obtuse, outer shorter. *Flowers* 5–6, longer than the involucre. *Pappus* white, scabrous. *Fruit* angled, and corollas covered with scattered resinous points.—DISTRIB. Europe, Siberia to Japan, W. Asia to the Himalaya, N. Africa.—Leaves reputed tonic.

9. PETASI'TES, *Tournef.* BUTTER-BUR.

Perennial herbs. *Leaves* produced after the flowers, large, broad. *Heads* purplish or white, subdiœcious, in a spiciform panicle terminating an erect bracteate scape; male heads with a few fem. ray-flowers, female with a few males in the disk; invol. bracts sub-2-seriate, the exterior few and small; receptacle flat, naked. MALE fl. *Corolla* tubular, limb bell-shaped, 5-cleft; anther-cells simple; styles exserted, stout, arms connate, ovoid or clavate, papillose, terminated by 2 short small cones. FEMALE fl. *Corolla* tubular, short, very slender, mouth obliquely truncate, minutely toothed; style much exserted, arms short. *Fruit* cylindric, glabrous; pappus of many very soft slender hairs (much fewer in the male flowers).—DISTRIB. Europe, N. Asia, Arctic America; species about 10.—ETYM. πέτασος, an *umbrella*, from the size of the foliage.

1. **P. vulga'ris,** *Desf.*; leaves reniform or orbicular-cordate irregularly toothed. *Tussilago Petasites*, L. and *T. hybrida*, L.

Wet meadows and roadsides, from Skye and Moray southwards; ascends to 1,000 ft. in Northumberland; fl. March–May.—*Rootstock* extensively creeping, fleshy, stout. *Leaves* 3 in.–3 ft. diam., white or cobwebby beneath, and when young above also; petiole long, stout. *Stem* 4–18 in., stout,

purplish below; sheath ending in small leaves. *Thyrsus* 3–10 in., female longest, elongating after flowering; pedicels slender, shortest in the male, bracts subulate. *Male heads* ⅛, *female* ½ in. *Fruit* striate; pappus white, silky.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.

10. TUSSILA'GO, *Tournef.* COLTSFOOT.

A scapigerous herb, with creeping rootstock. *Leaves* large, produced after the flowers. *Heads* yellow, solitary, many-flowered; invol. bracts 1-seriate, with a few outer short ones; receptacle flat, naked. *Ray-flowers* female, multi-seriate, ligulate, narrow; *disk-flowers* male, campanulate, 5-toothed. *Anthers* without tails. *Style-arms* connate, clavate, papillose, with 2 very small cones. *Fruit* of the ray subcylindric, pappus-hairs very slender, multi-seriate, rough; of the disk imperfect, pappus 1-seriate.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America. ETYM. *tussis*, from its use as a *cough* medicine.

1. **T. Far'fara,** *L.*; leaves broadly cordate angled or lobed toothed.

Damp heavy soils, ascending to 2,700 ft. in the Highlands; fl. March–April.—*Rootstock* stout; stolons many, burrowing. *Leaves* 3–10 in. broad, cobwebby above, densely tomentose and white beneath. *Scapes* 1 or more, 4–10 in., tomentose, with many oblong appressed scales. *Head* 1–1½ in. diam., bright yellow, drooping in bud. *Pappus* soft, snow-white.—Leaves used for cigar-making and smoked in cases of asthma. Wool made into tinder.

11. AS'TER, *L.*

Perennial herbs. *Leaves* alternate or radical, quite entire or toothed. *Heads* solitary or many, usually radiate; disk yellow, ray white blue or purple; invol. bracts multi-seriate, herbaceous or leafy; receptacle flat, pitted, edges of the pits toothed. *Ray-flowers* 1-seriate, ligulate, female; *disk-flowers* tubular, 5-toothed, 2-sexual. *Anther-cells* simple. *Style-arms* of the ray-flowers linear with thickened margins, of the disk short, tipped with papillose cones. *Fruit* compressed; pappus-hairs multi-seriate, persistent, scabrid, unequal.—DISTRIB. Most temp. and cold regions, but chiefly America; species about 150.—ETYM. from the *star*-like flowers.

1. **A. Tripo'lium,** *L.*; leaves lanceolate or obovate-lanceolate.

Salt marshes, abundant; fl. July–Sept.—*Root* fusiform. *Stem* 2–3 ft., erect, sparingly branched, stout. *Leaves* 3–5 in., scattered, fleshy, slightly toothed or not, faintly 3-nerved, upper linear. *Heads* ½–⅝ in., corymbose, campanulate; peduncles slender, bracts small; invol. bracts few, oblong, obtuse, appressed. *Ray-flowers* whitish or purple, many few or 0 (var. *discoideus*). *Fruit* pilose; pappus dirty white.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria.—Used as a bad substitute for Samphire.

12. ERIG'ERON, *L.*

Characters of *Aster*, but *ray-flowers* multi-seriate; *fruit* compressed.—DISTRIB. Temp. and cold regions; species about 80.—ETYM. obscure.

1. **E. alpi'num,** *L.*; leaves radical, scape with 1 or few broad heads, ligules much longer than the reddish pappus. *E. uniflorum*, Sm. not L.

Alpine rocks, ascending to 3,000 ft., Breadalbane and Clova Mts.; fl. July–Aug.—Perennial, hispid, hairy. *Rootstock* short. *Radical leaves* spreading, oblong-lanceolate; cauline few, linear-oblong. *Scapes* solitary or few, 6–8 in.

Heads 1–3, ¾ in. diam.; peduncles stout, eglandular; invol. bracts almost villous, subulate-lanceolate. *Ray-flowers* very many, purple, ligule very slender. *Disk-flowers* yellow. *Fruit* hispid.—DISTRIB. Alps and Arctic regions of Europe, Asia, America; S. Chili and Fuegia.

2. **E. a'cre,** *L.*; stem leafy branched above, heads ½–¾ in. diam. panicled, ligules scarcely longer than the reddish pappus.

Dry banks, &c. in England; sandy coasts of Forfarshire; E. and S. of Ireland; fl. July–Aug.—Annual or biennial, hispidly hairy. *Stem* 1–2 ft., panicled above. *Leaves* quite entire; radical 2–3 in., obovate-lanceolate; cauline linear-oblong, obtuse, ½-amplexicaul. *Heads* axillary and terminal; peduncles slender, naked or bracteate; invol. bracts narrow-linear, hispid. *Ray-flowers* narrow, pale purple; disk pale yellow. *Fruit* hispid.—DISTRIB. Europe (Arctic), temp. and N. Asia, Himalaya, N. America.

E. CANADEN'SE, *L.*; stem leafy branched above, heads ¼ in. diam. panicled, ligules white, scarcely longer than the white pappus.

Introd. from America into waste places in England, common near London; absent from Scotland and Ireland; fl. Aug.–Sept.—Annual, sparingly hairy or glabrous. *Stem* 1–2 ft., corymbosely branched. *Leaves* all linear- or oblong-lanceolate, quite entire or sparingly toothed. *Heads* very many, small; peduncles slender. *Invol. bracts* slender, green with scarious margins, glabrous. *Ray-flowers* sometimes faintly purple, disk pale yellow.—DISTRIB. Widely spread over most temp. and warm countries.

13. BEL'LIS, *L.* DAISY.

Annual or perennial small herbs. *Leaves* usually all radical, petioled, toothed. *Heads* solitary, disk yellow, ray white or pink; involucre campanulate, bracts 1–2-seriate, herbaceous; receptacle conical, papillose. *Ray-flowers* many, 1-seriate, female, ligulate; style-arms linear, obtuse, margins thickened. *Disk-flowers* tubular, 2-sexual, 4–5-toothed; anther-cells simple; style-arms short, thick, tipped by papillose cones. *Fruit* compressed, obovate, subhispid; pappus 0.—DISTRIB. Europe, N. Africa, N. America; species 3 or 4.—ETYM. *bellus*, from its *pretty* appearance.

1. **B. peren'nis,** *L.*; perennial, stemless, leaves obovate-spathulate.

Pastures and meadows; ascends to near 3,000 ft. in the Highlands; fl. all the year.—Glabrous or pilose. *Rootstock* short, fibres stout. *Leaves* 1–3 in., fleshy, obtuse or rounded at the crenate tip, midrib broad. *Scape* 2–5 in. *Head* ¾–1 in. diam., solitary; invol. bracts green, obtuse, often tipped with black. *Ray-flowers* white or tipped with pink, disk bright yellow.—DISTRIB. Europe.

14. SOLIDA'GO, *L.* GOLDEN-ROD.

Herbs, often shrubby at the base. *Leaves* alternate, entire or serrate. *Heads* usually in branched scorpioid cymes, yellow, rayed; involucre oblong, bracts multi-seriate, appressed; receptacle naked, smooth or pitted. *Ray-flowers* 1-seriate, ligulate, female; style-arms slender, linear, obtuse. *Disk-flowers* tubular, 2-sexual, 5-fid; anther-cells simple; style-arms ½-terete, tipped with papillose cones. *Fruit* many-ribbed; pappus-hairs 1-seriate, scabrid.—DISTRIB. Arctic and temp. N. hemisphere, chiefly N. American; species about 100.—ETYM. obscure.

1. **S. Virgau'rea,** *L.*; leaves linear- or lanceolate-oblong.

Thickets, rocky banks, &c.; ascending to 2,800 ft. in the Highlands; fl. July–Sept.—*Rootstock* stout. *Stem* erect, sparingly branched, 4–24 in., glabrous, or pubescent with curled hairs. *Leaves* 1–4 in., obscurely toothed, obtuse or acute. *Heads* crowded, ⅓ in., shortly peduncled, golden yellow; invol. bracts linear, acute, glabrous, green, margins scarious. *Ray-flowers* 10–12, spreading; disk 10–20. *Fruit* pubescent; pappus white.—DISTRIB. N. temp. and Arctic Europe, Asia, Himalaya, and America.

VAR. 1, *virgaurea* proper; tall, leaves all oblong-obovate quite entire.—VAR. 2, *angustifolia*, Gaud.; tall, leaves oblong-lanceolate upper narrower often serrate.—VAR. 3, *cambrica*, Huds. (sp.); short, leaves broader ciliate, cyme simple, heads larger. Usually in mountainous situations.

15. LINOSY'RIS, *Cassini.* GOLDIELOCKS.

Erect, perennial herbs. *Leaves* crowded, alternate, small, narrow. *Heads* solitary or corymbose, yellow, not rayed; invol. bracts in many series, imbricate, shorter than the flowers; receptacle flat, pitted, margins of the pits fleshy, toothed. *Flowers* all tubular and 2-sexual, deeply 5-fid; anthers exserted, cells simple; style-arms short, with long papillose cones. *Fruit* oblong, compressed, silky; pappus-hairs 2-seriate, scabrid. DISTRIB. Europe, W. Asia; species about 10.—ETYM. obscure.

1. **L. vulga'ris,** *Cass.*; leaves quite entire. *Chrysocoma*, L.

Limestone rocks, Orme's Head, Worle Hill, and Berry Head; a native? *Watson;* fl. Aug.-Sept.—Glabrous. *Stems* ½–1½ in., woody at the base, ribbed, simple, wiry, leafy. *Leaves* 2–3 in., very narrow, acute, rather thick, gradually narrowed from beyond the middle to the base, dotted, 1-nerved. *Heads* ½–¾ in. diam., in terminal, dense, hemispheric corymbs; peduncles slender, bracteate; involucre gummy, puberulous, its bracts subulate, much shorter than the flowers. *Pappus* reddish.—DISTRIB. Europe from the Baltic southwards, N. Africa.

16. I'NULA, *L.*

Rather rigid herbs. *Leaves* alternate, erect, entire or toothed. *Heads* panicled corymbose or solitary, rayed, yellow; involucre campanulate, bracts in many series, herbaceous, outer often leafy; receptacle flat, naked. *Ray-flowers* female or neuter, 1-seriate, ligulate; style-arms slender, obtuse. *Disk-flowers* tubular, 2-sexual; anther-cells tailed; style-arms short, terminated by papillose cones. *Fruit* terete or angled; pappus-hairs 1-seriate, scabrid, or outer row short.—DISTRIB. Europe, temp. and subtrop. Asia; species about 50.—ETYM. The old Latin name.

* *Pappus without an outer series of short bristles or scales.*

1. **I. Cony'za,** *DC.*; pubescent, leaves ovate-lanceolate, corymbs branched, fruit terete subglabrous. *Conyza squarrosa*, L. *Ploughman's spikenard.*

Copses and dry banks, from York and Westmoreland southwards; fl. July–Sept.—Biennial. *Stem* 2–5 ft., erect. *Leaves* 3–5 in., downy beneath, lower petioled, upper subsessile. *Heads* ¾ in.; invol. bracts very unequal, linear-oblong, outer slightly recurved obtuse, inner acuminate; ligule inconspicuous. *Fruit* with a few scattered hairs; pappus shining, reddish.—DISTRIB. Europe from Denmark southwards, W. Asia.

2. **I. crithmoi'des,** *L.*; glabrous, leaves linear fleshy, heads few in simple corymbs, fruit terete silky. *Golden Samphire.*

Maritime marshes and rocks; Wigton, S.W. Wales, Cornwall, S. and E. of Ireland; fl. July–Aug.—Perennial, glabrous, yellow-green. *Stem* 6–18 in., stout, rarely branched, very leafy. *Leaves* 1–2 in., sessile, gradually contracted to the base, entire or shortly 2–4-lobed at the tip. *Heads* 1 in. diam., on long bracteate peduncles; invol. bracts linear-lanceolate; ligule short. *Pappus-hairs* rigid, unequal, dirty white.—DISTRIB. Coasts of Europe from Belgium southwards, N. Africa.

3. **I. salici'na,** *L.*; leaves linear-oblong toothed and ciliate, upper sessile auricled, heads solitary, fruit terete glabrous.

Shores of Lough Derg, Galway; fl. July–Aug.—Perennial, glabrous or slightly hairy. *Stem* 12–18 in., leafy. *Leaves* 2–3 in., rigid, lower obovate-lanceolate, glabrous above, slightly hairy beneath with reticulate nerves. *Heads* 1½ in. diam.; invol. bracts linear-oblong, ciliate, outer leafy reflexed; ligules slender. *Pappus* dirty white.—DISTRIB. All Europe.

4. **I. Hele'nium,** *L.*; tall, stout, downy, leaves large toothed, heads very large, invol. bracts leafy, fruit 4-angled glabrous. *Elecampane.*

Copses and meadows in England, rare and local; often naturalized; wild in Yorkshire (*Baker*); a native? *Watson;* fl. July–Aug.—*Rootstock* large, succulent. *Stem* 2–5 ft., very stout, branched. *Leaves* velvety beneath; radical 1–1½ ft., oblong-lanceolate, long-petioled; cauline sessile, auricled, ovate-cordate, acute. *Heads* 3 in. diam.; peduncles long, stout, naked; invol. bracts broadly ovate, velvety; ligules long, slender. *Pappus* pale reddish.—DISTRIB. Europe from Gothland southwards, Siberia; introd. in N. America.—Formerly cultivated by cottagers as an aromatic and tonic; its rootstock is still used candied.

** *Pappus with an outer row of very short scales.*—PULICAR'IA, *Gærtn.*

5. **I. dysenter'ica,** *L.*; woolly or cottony, leaves oblong-cordate ½-amplexicaul, ligules long, scales of pappus connate toothed. *Flea-bane.*

Moist places, from Isla and Haddington southwards; rare in Scotland, common in Ireland; fl. July–Sept.—*Rootstock* creeping, stoloniferous. *Stem* branched above, very leafy. *Leaves* 1½–2½ in., irregularly waved and toothed. *Heads* 1 in. diam., few, terminal; peduncles naked, and involucre densely woolly; bracts setaceous; ray twice as long as the disk, very slender. *Fruit* silky; pappus-hairs dirty white, few, unequal.—DISTRIB. Europe from Denmark southwards, N. Africa.—Bitter, formerly used in dysentery.

6. **I. Pulicar'ia,** *L.*; pubescent, leaves oblong-lanceolate sessile, ligules very short, scales of pappus free. *P. vulgaris,* Gærtn.

Moist sandy places, rare, from Hereford and Leicester to Dorset and Kent; fl. Aug.–Sept.—Annual, slightly glandular. *Stem* 6–18 in., irregularly much branched, leafy. *Leaves* 1–1½ in., obscurely toothed, base with small auricles. *Heads* ⅛–¼ in. diam., subsolitary, terminal; peduncles short, stout; invol. bracts subulate, glandular-pubescent; ligules erect. *Fruit* terete, silky; pappus-hairs few, irregular, dirty white.—DISTRIB. Europe from Gothland southwards, N. Africa, Siberia, W. Asia.

17. BI'DENS, *L.* BUR-MARIGOLD.

Annual herbs, usually glabrous. *Leaves* opposite, entire or divided, upper sometimes alternate. *Heads* solitary or corymbose, not or rarely rayed, yellow; invol. bracts 2–3-seriate, outer often leafy; receptacle flattish, with bracteoles under each flower. *Ray-flowers,* if present, in

1 series, ligulate, neuter. *Disk-flowers* or all campanulate above, 5-toothed; anther-cells simple; style-arms linear, tipped by papillose cones. *Fruit* compressed, ribbed, ribs often aculeate; pappus of 2–5 rigid barbed bristles.—DISTRIB. All temp. and trop. regions; species about 60.—ETYM. From the 2 stiff pappus-bristles of some species.

1. **B. cer'nua,** *L.*; leaves sessile undivided, heads drooping.

Watery places from. Elgin and Dumbarton southwards; fl. July-Oct.—Glabrous, or slightly hispid above. *Stem* 1–2 ft., stout, succulent, terete, branched above, leafy. *Leaves* 2–3 in., in connate pairs, oblong-lanceolate, coarsely serrate. *Heads* 1–1½ in. diam.; peduncles ebracteate; outer invol. bracts leafy, spreading or reflexed; inner shorter, broadly-oblong, obtuse, streaked with black. *Ray-flowers* few, short, broad, or 0. *Fruit* narrow-obovoid, ribs 4 with reversed bristles; pappus-bristles usually 4.—DISTRIB. Europe, Siberia, N.W. India, N. America.

VAR. 1, *discoi'dea;* ray 0. Abundant.—VAR. 2, *radia'ta;* rayed. Rare and local, England only.

2. **B. tripartı'ta,** *L.*; leaves petioled simple or 3-cleft, heads suberect.

Watery places from Islà and Clackmannan southwards; fl. July–Sept.—Habit of *B. cernua*, but more slender; leaves often 3-partite; head smaller; outer invol. bracts narrower, inner acute, and pappus-bristles 2 shorter.—DISTRIB. Europe (Arctic), N. Africa, W. Asia, N.W. India, N. America.

17*. *GALINSO'GA. Ruiz and Pavon.*

Annual trichotomously branched herbs. *Leaves* opposite, triple-nerved, serrate. *Flower-heads* small, yellow, rayed; invol. bracts 1-seriate, margins scarious; receptacle conical, with entire or 3-fid lanceolate bracteoles under each flower. *Ray-flowers* female; tube short, pubescent; ligule very broad, short, 3-fid; style-arms linear, obtuse. *Disk-flowers* tubular, 2-sexual, 5-toothed; anthers short, with a short terminal appendage, cells shortly tailed. *Fruit* hispid; pappus of 1 series of ciliate scales.—DISTRIB. S. America; species 1 or 2.—ETYM. Don M. M. de Galinsoga, a Spanish botanist.

G. PARVIFLO'RA, *Cav.*; leaves ovate obtusely-serrate ciliate.

Cultivated fields and roadsides; abundant at Kew, and increasing; introd. from Peru; fl. July–Oct.—More or less pubescent. *Stem* 1–2 ft., slender. *Leaves* 1–2 in., shortly petioled. *Heads* in dichotomous cymes, ⅛–¼ in. diam.; peduncles ebracteate, glandular; involucre hemispherical; bracts unequal; oblong, ciliate. *Ray-flowers* 4–6. *Fruit* obovoid, compressed, black; pappus, scales 10–15, narrow-oblong.—DISTRIB. Trop. S. America.

18. ANTHE'MIS, *L.*

Herbs, sometimes shrubby below, strong-scented. *Leaves* alternate, 2-pinnatifid. *Heads* solitary, yellow, with (rarely without) a broad white ray; invol. bracts imbricate, in few series; receptacle flat or conic; bracteoles membranous, slender. *Ray-flowers* 1-seriate, ligulate, female or neuter; style-arms short, edges thickened, tips obtuse papillose. *Disk-flowers* tubular, 2-sexual, 5-toothed; anther-cells not tailed; style-arms as in the female. *Fruit* subterete, grooved or striate, crowned with a tumid disk; pappus 0, or a short membrane.—DISTRIB. Europe, N. Africa, W. Asia; species about 35.—ETYM. The old Greek name.

1. **A. arven'sis,** *L.*; annual, bracteoles of receptacle mucronate, ray-flowers female white, disk-flowers winged. *Corn Chamomile.*

Fields and waste places, local, from Lanark and Moray southwards; S. and E. of Ireland, rare; a colonist, *Watson;* fl. June–Aug.—Pubescent or hoary. *Stem* 1–2 ft., usually erect from a decumbent base, branched. *Leaf-segments* ⅛–¼ in., linear, acute, not dotted. *Heads* 1–1½ in. broad; peduncles rather long, slightly swollen upwards; invol. bracts scarious, pale, obtuse, inner lacerate. *Fruit* glabrous, subequally ribbed all round, truncate; disk broad, crenulate.—DISTRIB. Europe, N. Africa, W. Asia; introd. into N. America.

VAR. *anglica,* Spr. (sp.); leaves fleshy, pinnatifid, pinnules deeply serrate, receptacle flat. *A. maritima,* Sm. not L. Sea-coast, Northumberland, Durham.

2. **A. Cot'ula,** *L.*; annual, erect, bracteoles of receptacle setaceous, ray-flowers usually neuter white, disk-flowers winged. *Stinking May-weed.*

Cultivated fields, from Dumbarton and Fife southwards; rare in the N. of England and in Scotland; common except in the N.W. of Ireland; a colonist, *Watson;* fl. June–Sept.—Glabrous or pilose, fœtid. *Stem* 8–18 in., corymbosely branched. *Leaves* glandular-dotted, segments very narrow. *Heads* as in *A. arvensis,* but peduncles more slender and invol. bracts narrower at the tip. *Fruit* faintly ribbed, more strongly on the back.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in N. America.—Acrid, emetic; a troublesome weed; foliage blisters the hand.

3. **A. nob'ilis,** *L.*; perennial, bracteoles of receptacle lanceolate obtuse, ray-flowers female white, disk-flowers cylindric. *Chamomile.*

Pastures and dry soils, from Anglesea and Durham southwards; rare and not indigenous in Scotland; common in Ireland; fl. July–Sept.—Woolly or pubescent, aromatic. *Branches* spreading from the root, leafy. *Leaf-segments* linear. *Heads* 1–1½ in. diam., few; peduncles long, slender; invol. bracts pubescent, scarious. *Ray-flowers* sometimes 0. *Fruit* obovoid, terete; disk very small, concealed by the inflated base of the corolla.—DISTRIB. France, Spain, Germany, Austria, N. Africa.—Tonic and febrifuge.

19. ACHILLE'A, *L.*

Perennial herbs. *Leaves* alternate, entire or divided. *Heads* corymbose, rayed, yellow, or with the ray white or purple; invol. bracts oblong, margins sometimes discoloured and scarious; receptacle narrow, elongate, covered with chaffy bracteoles. *Ray-flowers* female, few; ligule broad, short. *Disk-flowers* tubular, 2-sexual, compressed, 5-toothed; anther-cells not tailed. *Fruit* oblong, compressed, margined; pappus 0.—DISTRIB. Europe and N. Asia; rarer in America; species about 50.—ETYM. Mythical.

1. **A. Ptar'mica,** *L.*; leaves linear serrulate, heads few. *Sneeze-wort.*

Meadows, banks, and waste places; ascends to 2,200 ft. in the Highlands; fl. July–Sept.—Glabrous or pubescent. *Rootstock* creeping extensively. *Stem* 1–2 ft., erect, rigid, ribbed, sparingly branched. *Leaves* 2–3 in., sessile, scattered, teeth cartilaginous. *Heads* corymbose, ½ in. diam., hemispheric; peduncles ebracteate; receptacle convex, invol. bracts pubescent, rigid, outer lanceolate, acute, margins purple, inner oblong, obtuse. *Ray-flowers* 8–12, ligule reflexed broad, as long as the involucre; disk greenish-white. *Fruit* glabrous, shining.—DISTRIB. Europe except Greece and Turkey, Siberia; introd. in N. America.—Rootstock pungent, a sialogogue.

2. **A. Millefo'lium,** *L.*; leaves 3-pinnatifid. *Yarrow, Milfoil.*

Pastures, ascending to near 4,000 ft. in the Highlands; fl. May–Sept.—Glabrous, pubescent or woolly. *Rootstock* extensively creeping, stoloniferous. *Stem* ½–1½ in., erect, furrowed, usually simple, leafy. *Leaves* 2–6 in., linear-oblong, radical petioled; leaflets and linear-acute segments very close-placed. *Heads* many, ¼ in. diam., corymbose, ovoid; peduncles short, stout, ebracteate; involucre bracts oblong, obtuse, rigid, brown-edged. *Ray-flowers* many, white pink or purple; ligule orbicular, shorter than the involucre, reflexed; disk white or yellowish. *Fruit* glabrous, shining.—DISTRIB. Europe (Arctic), temp. and cold N. Asia, Himalaya, N. America. —A reputed astringent.

20. DIO'TIS, *Desf.* COTTON-WEED.

An erect, branched, perennial herb, everywhere densely clothed with felted white, grey, or buff wool. *Leaves* alternate, oblong. *Heads* subglobose, discoid, yellow; involucre campanulate, bracts oblong; receptacle flattish, bracteolate. *Flowers* all tubular and 2-sexual, much compressed, 5-toothed, corky, with 2 wings produced downwards over the ovary as persistent spurs; anther-cells not tailed. *Fruit* angular, crowned by the corolla-base; pappus 0.—ETYM. *δίς* and *οὖς*, from the *ear*-like corolla-lobes.

1. **D. marit'ima,** *Cass.*; stems very many, leaves sessile obtuse.

Sandy shores, Landguard Fort, Suffolk; Kerry and Waterford; St. Ouen's Bay, Jersey; formerly in other localities on the E. and S. coast of England; fl. Aug.–Sept.—*Rootstock* creeping, woody. *Stems* 6–12 in., stout, ascending, branched at the top. *Leaves* ½ in., entire or toothed. *Heads* ½ in. diam., in small dense terminal corymbs; bracteoles of receptacle oblong, acuminate, with woolly tips. *Fruit* curved, smooth, glabrous, 5-ribbed.—DISTRIB. Shores of Europe from France southwards and eastwards, N. Africa.

21. MATRICA'RIA, *L.*

Annual, rarely perennial, branched herbs. *Leaves* alternate, much divided; lobes narrow. *Heads* yellow, ray white or 0; invol. bracts in few series, nearly equal; receptacle broad, flat or conical, elongate after flowering, ebracteolate. *Ray-flowers*, if present, 1-seriate, ligulate, female. *Disk-flowers* tubular, 2-sexual, 4–5-toothed; anther-cells not tailed. *Fruit* ribbed or angled, not winged; epigynous disk large; pappus 0.—DISTRIB. Europe, N. and S. Africa, W. Asia; species about 70.—ETYM. From its former use in *uterine* affections.

SUB-GEN. 1. **Matrica'ria** proper. *Receptacle* very convex or conical.

1. **M. Chamomil'la,** *L.*; aromatic, leaves 2-pinnatifid, segments very narrow, invol. bracts without dark edges, fruit 5-ribbed on the inner face. *Wild Chamomile.*

Fields, &c., from Cornwall to Kent, sporadic north of it, and in Scotland and Ireland; a colonist, *Watson;* fl. June–Aug.—Habit and appearance of glabrous forms of *Anthemis arvensis* and of the following, with the scent, &c. of *A. nobilis*, but fainter. *Stem* much branched. *Heads* ½–¾ in. diam., corymbose, ligules reflexed after flowering or 0; receptacle elongating during fruiting. *Fruit* small, grey; ribs slender, white; disk oblique.—DISTRIB. Europe, Siberia, W. Asia to N.W. India.—A tonic.

SUB-GEN. 2. **Pyre'thrum,** *Gærtn.* (gen.). *Receptacle* almost flat.

2. **M. inodo'ra,** *L.*; inodorous, leaves 2-pinnatifid, segments very narrow, involucre bracts edged with brown, fruit with 3 thick ribs on the inner face and 2 pits on the outer above.

Fields, &c., ascending to 1,200 ft. in the Highlands; fl. June–Oct.—Glabrous, very similar to *M. Chamomilla*, but not aromatic, leaf-segments usually large and more slender; heads larger, 2 in. diam.; ligules narrower, not reflexed till long after flowering; receptacle much less conical. *Disk* of fruit entire or 4-toothed.—DISTRIB. Europe (Arctic), Siberia, W. Asia.

VAR. 1, *inodo'ra* proper; annual or biennial, stem erect, barren shoots 0, leaf-lobes slender.—VAR. 2, *marit'ima* (sp.); more succulent, perennial, stem ascending, barren shoots 0, heads fewer, receptacle narrower, spaces between the ribs of the fruit narrower. Maritime localities.

M. PARTHE'NIUM, *L.*; leaves pinnate, segments broad lobulate and cut, fruit equally ribbed all round. *Pyrethrum*, Sm. *Fever-few.*

Hedgebanks, &c., rare in Scotland, usually a garden escape; a denizen, *Watson;* fl. July–Sept.—Perennial, pubescent and branched above, 1–2 ft. *Heads* many, ½–¾ in. diam.; involucre bracts ribbed, border scarious. *Receptacle* hemispheric. *Ligules* short, broad. *Disk* of fruit cup-shaped, membranous. —DISTRIB. Mid. and S. Europe, introduced elsewhere.—Tonic and bitter.

22. CHRYSAN'THEMUM, *L.*

Herbs or shrubs. *Leaves* alternate or radical, toothed or cut. *Heads* solitary or corymbose, yellow, or the ray white; involucre campanulate; bracts imbricate, margins scarious; receptacle flat or convex, naked. *Ray-flowers* 1-seriate, ligulate, female. *Disk-flowers* tubular, 2-sexual, terete or compressed, 4–5-toothed; anther-cells simple. *Fruit* of the ray-flowers ribbed or winged, of the disk-flowers compressed; pappus 0.—DISTRIB. Europe, W. Asia, N. Africa; species about 12.—ETYM. *χρυσός* and *ἄνθεμον*, from the *golden flowers.*

1. **C. seg'etum,** *L.*; ray-flowers golden yellow, involucre bracts very broad with broad scarious margins. *Corn Marigold.*

Cultivated fields; a colonist, *Watson;* fl. June–Sept.—Annual, glabrous, glaucous. *Stem* 1–1½ ft., erect, sparingly branched. *Leaves* petioled, obovate, toothed and lobed, lower pinnatifid, upper oblong ½-amplexicaul. *Heads* 2 in. diam.; peduncles stout, thickened upwards. *Ligules* with retuse or lobed tips. *Fruit* of the rays ribbed and narrowly 2-winged, of the disk not winged.—DISTRIB. Europe, N. Africa, W. Asia.

2. **C. Leucan'themum,** *L.*; ray-flowers white, involucre bracts narrow with dark purple margins. *Ox-eye Daisy.*

Meadows and waste places, ascending to 2,100 ft. in Wales; fl. June–Aug.—Perennial, glabrous or slightly hairy. *Stem* 1–2 ft., erect, simple or branched. *Leaves* obtusely cut or subpinnatifid; lower spathulate, petioled; upper oblong or lyrate with pinnatifid ½-amplexicaul bases. *Heads* 2 in. diam.; peduncles slender. *Ligules* notched at the tip. *Fruits* all terete, equally ribbed, of the ray with a small crown.—DISTRIB. Europe (Arctic), Siberia, W. Asia; introd. in N. America.

23. TANACE'TUM, *L.* TANSY.

Herbs, often shrubby below, strong-scented. *Leaves* alternate, usually much divided. *Heads* solitary or corymbose, subglobose, discoid, yellow; involucre bracts scarious at the edges; receptacle convex, naked. *Outer flowers* 1-seriate, female, tubular, 3–4-toothed. *Disk-flowers* tubular, male, 4–5-toothed; anther-cells not tailed. *Fruit* angled, with a large disk; pappus 0, or an irregular membrane.—DISTRIB. Europe, N. and S. Africa, all temp. and cold Asia, N. America; species about 50.—ETYM. doubtful.

1. **T. vulga're,** *L.*; leaves 1–2-pinnatifid, segments inciso-serrate.

Waste places in England, often naturalized; not wild in Ireland; and doubtfully in Scotland; fl. Aug.–Sept.—Perennial, glabrous or pubescent. *Stem* 2–3 ft., grooved and angled, leafy. *Leaves* 2–5 in., oblong, glandular-dotted, upper ½-amplexicaul, lower petioled. *Heads* many, ⅓ in. diam., corymbose, dull yellow; peduncles stout, ebracteate; involucre bracts coriaceous, appressed, outer acute shorter, inner obtuse with narrow scarious edges. *Outer flowers* exceeding the involucre, rarely 0, obliquely truncate. *Fruit* obovoid, 5-ribbed, disk membranous lobed.—DISTRIB. Europe (Arctic), Siberia, N.W. America; introd. in the U. States.—Bitter, tonic, vermifuge and febrifuge.

24. ARTEMIS'IA, *L.* WORMWOOD.

Herbs, often shrubby below, bitter or aromatic. *Leaves* alternate, often much cut. *Heads* small, racemed or panicled, discoid, yellow or purplish; involucre bracts with scarious margins; receptacle very narrow, flat or convex, naked pilose or fimbriate. *Flowers* few, all tubular; outer female with 3-toothed corollas; the rest male or 2-sexual with 5-toothed corollas; anther-cells not tailed. *Fruit* obovoid, disk minute; pappus 0.—DISTRIB. N. temp. zone; species about 180.—ETYM. The Greek Diana.

1. **A. campes'tris,** *L.*; leaves nearly glabrous, segments very slender, heads drooping glabrous, outer flowers only fertile.

Sandy heaths, Brandon, Thetford, and Bury; fl. Aug.–Sept.—Perennial, not aromatic. *Stem* and branches ascending, very slender, grooved. *Leaves* 1–2-pinnatifid, young silky; segments very few, ¼–½ in., acute, margins recurved; floral linear, entire. *Heads* very many, ⅛ in., yellow, in long slender racemes, subsessile, ovoid; receptacle glabrous. *Ray-corollas* dilated below.—DISTRIB. Europe, temp. Asia.

2. **A. vulga'ris,** *L.*; leaves broad white woolly beneath, segments broad acuminate, heads erect woolly, flowers all fertile. *Mugwort.*

Hedgebanks, &c., ascending to 1,200 ft. in Northumberland; fl. July–Sept.—Perennial, aromatic. *Stem* 2–4 ft., erect, reddish, angled, grooved, branched. *Leaves* 2–3 in., 1–2 in. broad, glabrous above, margins recurved; petiole with pinnatifid auricles. *Heads* in crowded, panicled, short, erect, woolly spikes, ovoid, reddish-yellow; receptacle glabrous. *Ray-flowers* with slender cylindric corollas.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya.—Formerly used to flavour drinks.

3. **A. Absin'thium,** *L.*; leaves silky on both surfaces, segments oblong obtuse, heads drooping silky, outer flowers fertile. *Wormwood.*

Waste places, local, from Forfar southwards; ascends (cultivated) to 2,200 ft. in Northumberland; rare in N. and W. of Scotland; doubtfully native in Ireland;

fl. Aug.–Sept.—Perennial, very aromatic, silkily pubescent. *Stems* 1–3 ft., ascending, grooved and angled. *Leaves* 1–2 in., dotted, 2–3-pinnatifid; segments many, spreading. *Heads* hemispheric, subsessile, in panicled leafy racemes, yellow; receptacle pilose. *Ray-corollas* dilated below.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, N.W. India, N. America.—Aromatic, tonic, vermifuge, and used to flavour drinks.

4. **A. marit'ima,** *L.*; leaves white and woolly beneath, segments linear obtuse, heads erect or drooping cottony, flowers all fertile.

Salt marshes and ditches, rare in Scotland, from Wigton and Aberdeen southwards; Co. Dublin in Ireland; fl. Aug.–Sept.—Woolly or hoary, scarcely aromatic. *Rootstock* woody, branched. *Stem* 10–18 in., ascending. *Leaves* 1–2 in., 2-pinnatifid; segments many, very narrow, spreading. *Heads* crowded in short, erect, panicled spikes, reddish, narrow oblong; receptacle glabrous. —DISTRIB. Coasts of Europe and salt tracts of Siberia, and W. Asia. —*A. gallica,* Willd. (sp.), is not distinguishable as a well-marked variety, either by its more compact habit or erect heads.

25. GNAPHA'LIUM, *L.* CUD-WEED.

Herbs, sometimes shrubby below, usually tomentose or woolly. *Leaves* radical, or radical and cauline. *Heads* small, usually in terminal or axillary fascicled cymes or corymbs; invol. bracts appressed, almost transparent, as long as the flowers, coloured; receptacle flat, naked. *Outer flowers* female, in 1 or more series, very slender; style-arms slender, tips truncate, papillose. *Disk-flowers* 2-sexual, limb dilated 5-lobed; anther-cells tailed; style-arms short. *Fruit* terete or compressed; pappus-hairs 1-seriate, very slender.—DISTRIB. All temp. and sub-trop. regions; species about 100.—ETYM. γνάφαλον, from their *woolly* habit.

* *Stem leafy. Female flowers in many series. Fruit terete.*

1. **G. luteo-al'bum,** *L.*; annual, stems simple, heads very glistening in dense ebracteate corymbs.

Light soils, Jersey and Guernsey; sporadic and doubtfully indigenous in Norfolk, Suffolk, and Sussex; fl. July–Aug.—Densely cottony. *Stems* many, 6–12 in., decumbent at the base, leafy. *Leaves* 1–2 in., linear-oblong, obtuse or acute, ½-amplexicaul, margin sinuate. *Heads* ¼ in. diam., pale yellow; invol. scales hyaline. *Fruit* papillose.—DISTRIB. All warm countries.

2. **G. sylvat'icum,** *L.*; perennial, stems simple, heads in leafy racemes or spikes, or in alternate fascicles along the spike.

Woods, pastures, and copses, ascending to 1,600 ft. in the Highlands; rare in the south; fl. July–Sept.—White, cottony. *Rootstock* woody. *Stems* 2–12 in. *Leaves* 1–3 in., narrowly linear or obovate-lanceolate, acute, 1-nerved; petiole not ½-amplexicaul. *Heads* subcylindric, ¼ in.; invol. bracts unequal, scarious, yellow or red-brown above, obtuse, outer cottony. *Fruit* puberulous.—DISTRIB. Europe (Arctic), Siberia, W. Asia, N. America.

VAR. 1, *rectum,* Sm. (sp.); leaves narrow usually woolly below only, spike elongate, pappus white or brown.—VAR. 2, *norvegicum,* Gunn. (sp.); leaves broader, woolly on both surfaces, floral suddenly smaller, spike short, invol. bracts very dark, fruit longer, pappus white. Mts. of Forfarshire, Atholl, Perth and Ross; absent from England and Ireland.

3. **G. uligino'sum,** *L.*; annual, stems diffuse, heads terminal.

Damp places, especially in light soil; fl. July–Sept.—Cottony above, rarely glabrate. *Stems* 2–6 in., usually many, erect from the decumbent base. *Leaves* narrow, gradually dilated upwards, acute or obtuse; petiole not amplexicaul. *Heads* ⅛ in. long, sessile, clustered, subtended by long linear leaves; invol. bracts narrow, subacute, pale brown. *Fruit* very minute.—DISTRIB. Europe (Arctic), Siberia, N. America.—Syme distinguishes a var. *pilula're*, Wahl. (sp.), with papillose fruit, found by him at Toft in Cambridgeshire.

** *Leaves chiefly radical. Female flowers in one series. Fruit compressed.*

4. **G. supi'num,** *L.*; perennial, tufted, scapes with 1 or few heads.

Alpine and subalpine rocks and streams, from Stirling northwards, ascending to near 4,300 ft.; fl. July–Aug.—Dwarf; tufts 1–6 in. diam., covered with cottony appressed wool; roots fibrous, dark brown. *Leaves* ½–1 in., narrow, linear-lanceolate, subacute. *Scapes* ½–3 in., slender, with few linear leaves. *Heads* 1–3, ¼ in. diam., sessile; invol. bracts scarious, brown above, woolly, outer obtuse, inner acute. *Fruit* pubescent; pappus white.—DISTRIB. Alpine and Arctic Europe and N. America.

26. ANTENNA'RIA, *Brown.*

Characters of *Gnaphalium*, but heads dicœcious or nearly so. *Flowers* all tubular; female filiform, 5-toothed; style slender, funnel-shaped; male tubular, limb dilated above; anthers partly exserted, cells tailed; style undivided. *Fruit* nearly terete; pappus-hairs 1-seriate, of female flowers filiform, of males thickened upwards and serrate.—DISTRIB. Temp. and cold Europe, N. Asia, India, N. America.—ETYM. From the likeness of the male pappus to the *antennæ* of a butterfly. Species about 12.

1. **A. dioi'ca,** *Br.*; herbaceous, heads in a simple corymb. *Cat's-foot.*

Mountain heaths and sandy pastures, ascending to near 2,000 ft. in Scotland, rarer in the south; fl. June–Aug.—Perennial. *Stems* densely tufted; barren shoots many. *Leaves* chiefly radical, ½–1½ in., spathulate, apiculate, silky below. *Scapes* 2–8 in., slender, cottony, with many linear bracts. *Heads* 2–8, crowded; male subglobose, ¼ in. diam., outer invol. bracts scarious cottony, inner longer with a white or pink radiating obtuse ligule, stamens exserted; female twice as large, invol. scales more numerous, shorter than the flowers. *Fruit* papillose; pappus-hairs silky.—DISTRIB. Europe (Arctic), N. and W. Asia, E. and W. N. America.

VAR. *hyperbo'rea,* Don (sp.); leaves broader slightly cottony above. Skye.

A. MARGARITA'CEA, *Br.*; half shrubby, heads in a compound corymb.

Naturalized in S. Wales, Jersey, Guernsey, and several places in Scotland; fl. July–Aug.—Perennial, stoloniferous. *Stem* 2–3 ft., leafy, stout, and leaves below and corymb densely clothed with white or buff cottony tomentum. *Leaves* 3–5 in., narrow-lanceolate, acuminate, sessile and ½-amplexicaul, glabrous above. *Heads* ½ in. diam., of male fl. globose; female more campanulate; invol. bracts oblong, brown below, white and radiating above.—DISTRIB. N. America.

27. FILA'GO.

Slender annual cottony herbs. *Leaves* alternate, quite entire. *Heads* in axillary and terminal clusters; involucre bracts imbricate, often opposite in series, scarious, acuminate, woolly; receptacle elongate, slender, with bracteoles under the outer flowers. *Outer flowers* in 1 or more series, female, outermost usually concealed in the concave inner involucre bracts; corolla very slender; style-arms slender. *Disk-flowers* numerous, 2-sexual or male; corolla-limb dilated, 4–5-toothed; anther-cells tailed; style-arms short. *Fruit* terete, papillose; pappus-hairs of the central florets very slender, in 1- or more series, of the marginal often 0.—DISTRIB. Europe, N. Africa, W. Asia; species 8–10.—ETYM. *filum*, from the cottony *hairs*.

1. **F. germanica**, *L.*; leaves linear-oblong acute waved, heads 20 or more in terminal spherical clusters, involucre bracts in many opposite series not spreading acuminate and mucronate.

Dry pastures and banks, from Ross and Cantire southwards; rare in Scotland; common in Ireland; fl. July–Aug.—*Stem* 6–18 in., stiff, erect or ascending, dichotomously branched, flower-heads in the forks; branches ascending, leafy. *Leaves* ½–1 in. *Heads* ½ in. broad; involucre bracts glistening, subulate-lanceolate, longer than the flowers, pale reddish-brown; female flowers in several series. *Fruit* compressed, papillose.—DISTRIB. Europe from Gothland southwards, Siberia, W. Asia to India; introd. in N. America.

VAR. 1, *canescens*, Jord. (sp.); heads obscurely 5-angled leafless, involucre bracts folded longitudinally, tips yellowish.—VAR. 2, *apiculata*, G. E. Sm. (sp.); taller, leaves broader, heads acutely 5-angled, involucre bracts purplish boat-shaped, tips reddish. Rare.—VAR. 3, *spathulata*, Presl (sp.); stem short, leaves spathulate, heads 5-angled subtended by acute leaves, involucre bracts boat-shaped, tips pale. Not uncommon.

2. **F. minima**, *Fries;* leaves small lanceolate, heads 3–6 in terminal and axillary clusters longer than the subtending leaves, involucre bracts in 1–2 series at length spreading. *F. montana*, DC. not L.; *Gnaphalium arvense*, Willd. not L.

Dry places, rather local, from Ross southwards; N.E. and S.E. of Ireland; fl. June–Sept.—Slender, erect, 6–12 in., dichotomous. *Leaves* ¼ in., erect. *Heads* ⅛ in., woolly, sessile; involucre bracts very gibbous and concave at the base, lanceolate, obtuse, glabrous, tips discoloured; female flowers in 1–2 series. *Fruit* terete, papillose.—DISTRIB. Europe, N. Africa, Siberia.

F. GALLICA, *L.*; leaves slender subulate, heads 2–6 in axillary clusters shorter than the subtending leaves, involucre bracts in 1–2 series subacute at length spreading.

Sandy fields, rare and local, Essex, Herts, and Bucks; a colonist, *Watson;* fl. July–Sept.—Very slender, much dichotomously branched. *Leaves* ½–¾ in., ½-amplexicaul. *Heads* ⅛ in., sessile, woolly; involucre scales very gibbous, concave at the base; tips scarious and discoloured. *Fruit* slightly compressed, papillose.—DISTRIB. Europe from Denmark southwards.

27*. *DORONICUM*, *L.* LEOPARD'S-BANE.

Herbs with creeping or tuberous rootstocks. *Radical leaves* petioled, cauline alternate, amplexicaul. *Heads* solitary or corymbose, rayed, yellow; involucre bracts in few series, linear, acuminate, nearly equal; re-

ceptacle conical, naked or pubescent. *Ray-flowers* ligulate, usually female only; style-arms truncate, penicillate at the tip only. *Disk-flowers* dilated above, 5-toothed; anther-cells not tailed; style-arms obtuse. *Fruit* oblong-turbinate, furrowed; pappus-hairs of the ray 0 or 1–3, of the disk in many series.—Europe, N. Asia, Mts. of India.

D. PARDALIAN'CHES, *L.*; radical leaves ovate-cordate, heads usually 3–5.

Naturalized in plantations; fl. May–July.—Pubescent and pilose. *Rootstock* creeping, stoloniferous. *Stem* 2–3 ft. *Radical leaves* 2–5 in., long-petioled, rounded at the tip; lower cauline ovate with dilated amplexicaul petioles, upper sessile. *Heads* 1½–2 in. diam., long-peduncled; invol. bracts long, subulate-lanceolate, glandular; receptacle pubescent. *Fruit* black, ribbed, of the ray glabrous without pappus, of the disk hairy with white pappus.—DISTRIB. Mid. and S. Europe.—Reputed poisonous.

D. PLANTAGIN'EUM, *L.*; radical leaves ovate, head usually solitary.

Naturalized in plantations; fl. June–July.—Habit of the preceding, but more slender and glabrous; leaves narrower, not cordate, usually narrowed into the petiole, repand-toothed, 3–5-ribbed, uppermost oblong.—DISTRIB. W. Europe from Belgium southwards.

28. SENE'CIO, *L.*

Herbs (the British species). *Leaves* alternate. *Heads* solitary or corymbose, usually yellow; invol. bracts 1-seriate with sometimes a few smaller at the base, narrow, appressed, herbaceous, usually discoloured at the tip; receptacle naked, smooth or pitted. *Ray-flowers* when present 1-seriate, female; style-arms truncate, tips penicillate. *Disk-flowers* tubular, 2-sexual, 5-toothed; anther-cells not tailed; style-arms obtuse. *Fruit* terete or angled, furrowed; pappus-hairs in many series, soft, slender, equal in length, caducous.—All temp. and cold climates; species about 500.—ETYM. *senex*, from the abundant hoary pappus.

SECTION 1. **Sene'cio** proper. *Involucre* with a few small bracts at the base. *Leaves* pinnatifid or 2-pinnatifid; except *S. aquaticus*.

1. **S. vulga'ris,** *L.*; annual, eglandular, heads few drooping, outer invol. bracts many, ligules usually 0. *Groundsel.*

Waste places, ascending to 1,600 ft. in Northumberland; fl. all the year.—Glabrous or cottony. *Stem* 6–15 in., often branched from the base, succulent. *Leaves* pinnatifid, irregularly coarsely toothed. *Heads* ½ in., cylindric, conical after flowering; outer invol. bracts dark, ovate-subulate. *Fruit* ribbed, silky.—DISTRIB. Europe (Arctic); introd. in all cool climates.

VAR. *radia'tus*, Koch; ray-flowers with short ligules. Channel Islands.

2. **S. sylvat'icus,** *L.*; annual, slightly glandular-pubescent, heads many spreading, outer invol. bracts very few subulate or 0, ligule short.

Dry banks and pastures, ascending to 1,000 ft. in the Highlands; fl. July–Sept.—Fœtid. *Stem* ½–3 ft., erect, leafy. *Leaves* as in *S. vulgaris*, but more deeply cut. *Heads* ½ in., cylindric; peduncles slender. *Fruit* faintly ribbed, silky.—DISTRIB. Europe, Siberia.—*S. lividus*, Sm. not L., is a form with larger auricles to the upper leaves.

3. **S. visco'sus,** *L.*; annual, glandular-pubescent viscid, heads few broad erect, outer invol. bracts few green ½ as long as the inner.

Waste dry ground, local, from Forfar and Dumbarton southwards, very rare in Ireland; fl. July–Aug.—Fœtid. *Stem* 1–2 ft., stout, rigid, grooved and angled, flexuous, branched. *Leaves* broad, sub-2-pinnatifid. *Heads* campanulate, nearly ½ in. long and ½ in. diam. *Fruit* slender, ribbed, glabrous. — DISTRIB. Europe.

4. **S. Jacobæ'a,** *L.*; perennial, tall, erect, almost glabrous, heads in a dense corymb, fruit of ray ribbed glabrous. *Ragwort.*

Roadsides and pastures, ascending to 2,100 ft. in the Highlands; fl. June–Sept.—Glabrous or slightly cottony. *Stem* 1–4 ft., stout, leafy. *Leaves* pinnatifid or irregularly 2-pinnatifid, lobed and toothed, terminal lobe large or small; upper leaves auricled, sessile; lower petioled. *Heads* ¾–1 in. diam., bright yellow, campanulate; outer invol. bracts few, small, subulate; peduncle slender, bracteate.—DISTRIB. Europe, Siberia, Dahuria, N.W. India.—A variety without ray rarely occurs.

5. **S. erucæfo'lius,** *L.*; perennial, tall, erect, cottony or pubescent, heads in a dense corymb, fruits all ribbed hairy. *S. tenuifolius,* Jacq.

Roadsides and banks from Berwick and Lanark southwards; E. of Ireland, very rare; fl. July–Aug.—Habit of *S. Jacobæa,* but more pubescent with curled hairs, especially above; rootstock shortly creeping; leaves broader, simply pinnatifid, with narrower lobes; heads larger, and pappus dirty white.—DISTRIB. Europe from Gothland southwards, Siberia, Dahuria.

6. **S. aquat'icus,** *Huds.*; biennial, tall, erect, rarely glabrous, heads in a very lax corymb, fruits all ribbed glabrous.

Sides of rivers, ditches, &c., abundant; ascending to 1,500 ft. in the Lake district; fl. July–Aug.—Very similar to *S. Jacobæa,* but usually of laxer growth, with longer petioled leaves, and larger heads. *Radical leaves* very variable, petioled, ovate or oblong, irregularly toothed, undivided or lobed, auricled or pinnatifid at the base, often purple below; upper irregularly lyrate-pinnatifid. *Heads* 1–1¼ in. diam.; peduncles slender.—DISTRIB. Europe, Siberia.—*S. barbarœifo'lius,* Reich., is a state with pinnatifid leaves.

S. SQUAL'IDUS, *L.*; annual or biennial, glabrous, stem short flexuous leafy, heads in a very lax corymb, fruits all ribbed silky.

Naturalized on old walls, &c., Oxford, Bideford, Allesley Church, Warwick, Cork; fl. June–Oct.—*Stem* 8–12 in., rather stout. *Leaves* irregularly lyrate-pinnatifid, lobes long or short, toothed lobulate or subentire, upper auricled and ½-amplexicaul. *Heads* ¾ in. broad; involucre broadly campanulate, bracts narrower than in the other species of this section; outer numerous, small, all usually dark-tipped.—DISTRIB. S. Europe.

** *Leaves undivided, toothed.*

S. SARACEN'ICUS, *L.*; leaves glabrous or nearly so, ray-flowers few.

Naturalized by river-sides and in moist meadows, from Aberdeen southwards, and in Ireland; fl. July–Aug. — *Rootstock* creeping, stoloniferous. *Stem* 3–5 ft., erect, stout, leafy. *Leaves* 5–8 in., linear-oblong, acute, sessile, lower shortly petioled, lowest auricled and ½-amplexicaul. *Heads* ½ in. diam., many, in lax puberulous corymbs; peduncles short, bracteate; involucre broadly campanulate, outer bracts subulate, inner narrowly linear-oblong, tipped with brown. *Fruit* glabrous.—DISTRIB. Europe from Holland southwards, Siberia.—Used as a styptic by Irish peasants.

7. **S. paludo'sus,** *L.*; leaves cottony beneath, ray-flowers very many.

Fens of Lincoln, Norfolk, Suffolk, and Cambridge, but now almost extinct; fl. June–July.—*Rootstock* short. *Stems* 3–6 ft., stout, erect, branched at the top, glabrous or slightly cottony, leafy. *Leaves* 3–6 in., sessile, narrowly oblong-lanceolate, coarsely serrate. *Heads* 1 in. diam., in lax, spreading, simple or compound corymbs; peduncles long, bracteate; involucre broadly campanulate, outer bracts long subulate, inner obtuse. *Fruit* glabrous.—DISTRIB. Europe from Gothland southwards, Siberia.

SECTION 2. **Cinera'ria,** *L.* (gen.). *Outer invol. bracts* 0. *Ray-flowers* spreading.

8. **S. palus'tris,** *DC.*; tall, erect, leafy, pubescent or villous, stem hollow, leaves sessile, heads many, fruit ribbed glabrous.

Fens of the Eastern counties, but now almost extinct; fl. June–July.—Biennial. *Stem* erect, 2–3 ft., stout, ribbed, unbranched. *Leaves* 3–5 in., ½-amplexicaul, oblong-lanceolate, sinuate-toothed, acute or obtuse. *Heads* ¾–1 in. diam., pale yellow, crowded in compound corymbs, broadly campanulate, villous with crisped hairs, short, as are the peduncles; invol. bracts many, slender. *Ray-flowers* short.—DISTRIB. Europe from Gothland to France and Austria, Siberia, Dahuria, N. America (Arctic).

9. **S. campes'tris,** *DC.*; scapigerous, pubescent and cottony, leaves petioled, heads few, fruit ribbed silky. *Cineraria integrifolia*, With.

Dry banks and chalk downs, from Anglesea and Cambridge to Sussex and Dorset; fl. May–June. *Rootstock* short, fibres thick. *Radical leaves* 1–2 in., spreading, coriaceous, shortly petioled, ovate, obtuse, entire or sinuate-toothed, pubescent under the cottony hairs. *Scape* 4–12 in., stout or slender bracts, narrow long appressed. *Heads* 1 in. diam., pale yellow; peduncle stout, erect, bracteate at the base; involucre broadly campanulate; bracts narrow, obtuse. *Ray-flowers* as long as the bracts.—DISTRIB. Europe (Arctic) to France and Italy, Siberia, Dahuria, N. America.

VAR. *marit'ima*, Syme; leaves broadly toothed. Maritime rocks, Holyhead.

29. LAPSA'NA, *L.* NIPPLEWORT.

A slender, erect, annual, branched herb; juice milky. *Leaves* alternate, petioled, lower lyrate, upper toothed or entire. *Flower-heads* small, yellow; invol. bracts few, 1-seriate, erect, outermost small; receptacle flat, naked, dotted. *Corollas* all ligulate; anther-cells not tailed; top of style and its linear obtuse arms pilose. *Fruit* slightly compressed, curved, striate, not beaked; pappus 0.—DISTRIB. Europe, W. Asia, N. Africa; species 4.—ETYM. An old Latin name.

1. **L. commu'nis,** *L.*; lower leaves lyrate-pinnatifid, upper entire.

Waste and cultivated ground; ascending to 1,300 ft. in Northumberland; fl. July–Sept.—*Stem* 1–2 ft., paniculately branched, hairs spreading. *Leaves* contracted into the petiole, membranous, terminal lobe very large, sinuate-toothed, lateral small. *Heads* many, ¼ in.; peduncles short, slender, naked; invol. bracts 8–10, linear, rigid, keeled, green, glandular or glabrous, tip contracted obtuse. *Fruit* pale.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to N.W. India; introd. in the United States.—Formerly eaten as a salad.

30. ARNOSE'RIS, *Gærtn.* LAMB'S or SWINE'S SUCCORY.

A small, annual, scapigerous herb; juice milky. *Leaves* all radical. *Heads* few, small, yellow; peduncles clavate, fistular; invol. bracts in 1 series, many, after flowering arching over the fruit; receptacle flat, naked, pitted. *Corollas* all ligulate; anther-cells not tailed; upper part of style and its short obtuse arms pilose. *Fruit* obpyramidal, furrowed and ribbed, not beaked, crowned by a coriaceous angular ring.—DISTRIB. Europe to Mid. Russia.—ETYM. ἄρνος, *a lamb*, and σέρις, *succory*.

1. **A. pusil'la**, *Gærtn.*; leaves obovate-spathulate or -lanceolate toothed.

Dry pastures and fields, from Banff and Elgin southwards; rare in Scotland and the E. and S. counties of England; not found in Ireland; a colonist, *Watson;* fl. June–July.—Glabrous or slightly hairy. *Leaves* 2–4 in., narrow. *Scapes* 4–12 in., many, slender, rigid, sparingly branched above. *Heads* campanulate, ½ in., inclined in bud; invol. bracts herbaceous, puberulous, linear-lanceolate, tips contracted obtuse. *Fruit* pale brown, rugose between the ribs.

31. CICHOR'IUM, *L.* CHICORY.

Perennial herbs, with spreading branches and milky juice. *Leaves* radical and alternate, toothed or pinnatifid. *Heads* axillary, solitary or crowded, sessile or stalked, blue or yellow; involucre cylindric; bracts in 2 series, inner erect, connate at the base, outer shorter appressed; receptacle flattish, naked, pitted or bristly. *Corollas* all ligulate; anther-cells not tailed; upper part of style and its slender arms pilose. *Fruits* crowded on the indurated receptacle, firmly embraced by the rigid invol. bracts, smooth, obovoid or turbinate, not beaked; pappus in 2 series of short obtuse scales.—DISTRIB. Europe, W. Asia; species 5.—ETYM. An old Greek name.

1. **C. Intybus**, *L.*; lower leaves runcinate, heads usually in pairs.

Waste places, roadsides, &c. throughout England; rare, if native, in Scotland and Ireland; fl. July–Oct.—Rather hispid. *Root* fleshy, tapering. *Stem* 1–3 ft., angled and grooved; branches straight, rigid, spreading. *Leaves* glandular-ciliate, oblong-lanceolate, upper ovate-cordate, amplexicaul. *Heads* many, 1–1½ in. diam.; peduncle thickened in the middle; invol. bracts herbaceous, outer linear-lanceolate, glandular-ciliate. *Flowers* bright blue, rarely white; ligule rather broad, truncate, 5-toothed. *Fruit* angled, pale, mottled.—DISTRIB. Europe, N. Africa, Siberia, N.W. India; introd. in N. America.—The origin of the cultivated Chicory; the roots are boiled and eaten, or dried and used as Coffee.

32. HYPOCHÆ'RIS, *L.* CAT'S-EAR.

Annual or perennial scapigerous herbs with milky juice. *Leaves* radical, pinnatifid. *Heads* on simple or dichotomously branched scapes; invol. bracts in many series, imbricate; receptacle flat, with narrow membranous bracteoles. *Corollas* all ligulate; anther-cells shortly tailed; upper part of style and its short obtuse arms hairy. *Fruits* striate, scabrous, beak of the outer very short, of the inner long, slender; pappus of one row of feathery hairs with usually an outer row of short, stiff bristles.—DISTRIB. Europe, W. Asia; species 6.—ETYM. doubtful.

1. **H. gla'bra,** *L.*; annual, leaves narrowly obovate-oblong toothed or sinuate, scapes many branched, involucre as long as the flowers, outer pappus short.

Dry fields, &c. from Ayr and Moray southwards; rare in Scotland; not found in Ireland; fl. June–Aug.—Almost glabrous. *Leaves* spreading, 2–4 in., rarely pinnatifid, obtuse or subacute. *Scapes* several, 6–12 in., slender or stout, naked or with 1–2 scale-like leaves; peduncles erect. *Heads* ½–¾ in., yellow, cylindric; involucre subcylindric; bracts very unequal, few, green, linear, acute. *Fruit* red-brown; pappus dirty white, longer than the involucre.—DISTRIB. Europe from Gothland southwards, N. Africa, W. Asia.

VAR. 1, *gla'bra* proper; marginal fruits not beaked.—VAR. 2, *Balbi'sii*, Lois (sp.); all the fruits beaked.

2. **H. radica'ta,** *L.*; perennial, leaves narrowly obovate-oblong sinuate- or runcinate-pinnatifid, scapes many branched, involucre shorter than the flowers, outer pappus short.

Meadows, waste places, &c., ascending to 1,600 ft. in the Highlands; fl. June–Sept.—Hispid, rarely glabrous. *Leaves* many, 3–10 in., hispid on both surfaces. *Scapes* 6–18 in., stout; peduncles with small scale-like leaves. *Heads* 1–1½ in. diam., yellow; involucre subcampanulate; bracts many, green, attenuated to the tip, often strongly ciliate on the margin and back. *Fruits* red-brown, all beaked, strongly muricate.—DISTRIB. Europe, N. Africa.

3. **H. macula'ta,** *L.*; perennial, leaves obovate-spathulate sinuate-toothed, scapes one or few, involucre shorter than the flowers ciliate with curly hairs, outer pappus 0. *Achyrophorus maculatus*, Scop.

Chalk and limestone pastures, rare, Westmoreland, N. Wales, Cornwall, Cambridge, Essex; fl. July–Aug.—Hispid. *Leaves* sessile, 1–4 in., often spotted above. *Scape* stout, glabrous above, rarely forked, with 1–2 scale-like leaves. *Heads* 1 in. diam., yellow; involucre broadly campanulate; bracts many, slender. *Fruits* all beaked, faintly muricate; pappus white.—DISTRIB. Europe, Siberia, Dahuria.

33. HELMIN'THIA, *Juss.* OX-TONGUE.

Hispid, branched, annual herbs; juice milky. *Leaves* alternate, uppermost opposite, ½-amplexicaul, toothed. *Heads* terminal, solitary, yellow; invol. bracts 2-seriate, ciliate, outer cordate spreading, inner erect; receptacle flat, naked, papillose. *Corollas* all ligulate; anther-cells shortly tailed; upper part of style and its slender arms pilose. *Fruit* compressed, transversely rugose, beak long erect slender; pappus of many series of feathery hairs.—DISTRIB. Europe, W. Asia, N. Africa; species 5.—ETYM. ἑλμίνθιον, from the *worm*-like fruits.

1. **H. echioi'des,** *Gærtn.*; lower leaves sinuate-toothed, upper cordate.

Fields and waste places in stiff soil in England, local; Berwick and Dunbar, doubtfully indigenous; S. and E. of Ireland, rare; fl. June–Oct.—Stout, erect, 2–3 ft., paniculately branched, hispid and setose, hairs with tumid bases. *Leaves* oblong-lanceolate, radical petioled, upper amplexicaul. *Heads* 1 in. diam., peduncles stout, stiff, rather swollen, diverging, naked; involucre hemispheric; outer bracts broadly cordate, foliaceous, inner acuminate. *Ligules* short. *Fruit* red-brown, long, curved; pappus pure white.—DISTRIB. Europe from Holland southwards, N. Africa.

34. TRAGOPO'GON, *L.*

Erect, usually simple glabrous herbs, with biennial or perennial taproots; juice milky. *Leaves* alternate, entire, amplexicaul. *Heads* solitary, yellow or purple; invol. bracts 1-seriate, usually exceeding the flowers, narrow, nearly equal, connate at the base; receptacle convex, naked or fimbriate. *Corollas* all ligulate; anther-cells tailed; upper part of style pilose, arms slender obtuse. *Fruit* slender, muricate, beak long; pappus-hairs in many series, rigid, feathery with naked tips, the hairs of the bristles horizontal and interlacing.—DISTRIB. Europe, N. Africa, W. Asia; species about 20.—ETYM. *τράγος* and *πώγων*, *goat's-beard.*

1. **T. praten'sis,** *L.*; leaf-sheaths much dilated, scape scarcely thickened upwards, flowers yellow. *Goat's-beard.*

Meadows, pastures, and waste places, from Lanark and Moray southwards; rare in Scotland and Ireland; fl. June–July.—Glabrous or slightly cottony on the involucre, glaucous. *Stem* 1–2 ft., stout, erect, simple or sparingly branched above. *Leaves* flexuous, slender, gradually contracted upwards from above the dilated sheath, linear towards the tip; radical with shorter sheaths, keeled, channelled above, midrib tubular. *Heads* ½–2 in. diam., yellow; involucre obconic, bracts about 8, 2-seriate, flat, often streaked with brown. *Fruit* variable in roughness; beak about as long as the body.—DISTRIB. Europe, W. Siberia.—Root edible. Flowers close at noon.

VAR. 1, *praten'sis* proper; flowers as long as the invol. bracts.—VAR. 2, *mi'nor*, Fries (sp.); flowers ½ as long as the invol. bracts. The most common form.—VAR. 3, *grandiflo'rus*, Syme; flowers much longer than the invol. bracts. Kent and Surrey, rare.

T. PORRIFO'LIUS, *L.*; leaf-sheaths slightly dilated, peduncle much thickened upwards, flowers purple. *Salsify.*

Wet meadows, rare and local, nowhere wild; a denizen, *Watson;* May–June.—Habit and chief characters of *T. pratensis*, but usually larger, with more muricate-fruits; ligule as long or shorter (var. *parviflorus*, Syme) than the invol. bracts.—DISTRIB. N. Europe, Siberia.—Occasionally cultivated in England, abundantly on the Continent.

35. PI'CRIS, *L.*

Erect, branched, hispid herbs; juice milky. *Leaves* alternate, entire or sinuate-toothed. *Heads* corymbose, yellow; invol. bracts many, unequal, outer spreading; receptacle flat, naked, pitted. *Flowers* all ligulate; anther-cells shortly-tailed; upper part of style and its slender obtuse arms pilose. *Fruit* curved, grooved, transversely rugose, not beaked; pappus-hairs 2-seriate, deciduous, feathery, connate below, outer fewer slender, inner broader at the base, plumose.—DISTRIB. Europe, temp. Asia; species about 20.—ETYM. *πικρός*, from its *bitterness.*

1. **P. hieracioi'des,** *L.*; leaves obovate-lanceolate, upper ½-amplexicaul.

Borders of fields and waste places in a stiff soil, chiefly in S. and E. of England, from Durham southwards; absent from Ireland; fl. July–Sept.—Hispid with stiff straight curled or hooked hairs. *Stem* 2–3 ft., stout, corymbosely branched. *Leaves* 4–12 in., narrow, lower petioled, upper sessile. *Heads* 1 in. diam., peduncles bracteate; involucre subcampanulate; outer bracts

short, clothed with black hairs. *Fruit* red-brown, angled; pappus snow-white.—DISTRIB. Europe, Siberia, Himalaya, Australia, New Zealand.

VAR. 1, *hieracioi'des* proper; branches divaricate, heads irregularly corymbose. —VAR. 2, *arva'lis*, Jord. (sp.); branches ascending, heads subumbellate. Leicestershire.

36. LEON'TODON, *L.* HAWKBIT.

Perennial, scapigerous herbs; juice milky. *Leaves* all radical, obovate, sinuate-toothed or pinnatifid. *Heads* on simple or branched scapes, yellow; invol. bracts many, in several series, outer smaller; receptacle flat, naked. *Flowers* all ligulate; anther-cells not tailed; style-arms linear, obtuse, and upper parts of style pilose. *Fruit* terete, grooved, transversely rugose; beak short; pappus-hairs rigid, 1–2-seriate, slightly dilated at the base, outer simple and rough, or the outer of toothed scales and the inner of one series of feathery hairs.—DISTRIB. Europe, W. Asia; species about 25.—ETYM. λέων and ὀδούς, from the *toothed* leaves.

SUB-GEN. 1. **Thrin'cia,** *Roth* (gen.). *Pappus* of outer flowers of toothed scales, of inner of feathery hairs. *Buds* drooping.

1. **L. hir'tus,** *L.*; leaves hispid oblong or lanceolate. *Hedypnois,* Sm.

Gravelly pastures, &c. from Fife and Lanark southwards, S. and Mid. Ireland; fl. July–Aug.—A hispid biennial; hairs often forked. *Leaves* 3–6 in., long-petioled. *Scapes* very many, 4–8 in. *Heads* ½–¾ in. diam.; involucre campanulate; bracts lanceolate, subacute, keeled, glabrous, hispid or ciliate on the edges and back. *Fruit* ⅛ in., closely grooved and minutely muricate; outer stouter, curved, almost smooth; pappus white.—DISTRIB. Europe from Gothland southwards.

SUB-GEN. 2. **Apar'gia,** *Willd.* (gen.). *Pappus* of all the flowers 2-seriate, slender; outer short, scabrid; inner longer, dilated at the base, feathery. *Buds* drooping.

2. **L. his'pidus,** *L.*; leaves hispid oblong-lanceolate. *Hedypnois,* Sm.

Meadows, &c., on dry soil, from Skye and Kincardine southwards, ascending to near 2,000 ft. in Northumberland; rather rare in Ireland; fl. June–Sept. —A hispid biennial; rootstock truncate; hairs often forked. *Leaves* 3–5 in. *Scapes* 6–18 in., few, slender, swollen at the top. *Heads* 1½ in. diam.; involucre obconic; bracts linear-lanceolate, tips woolly obtuse. *Fruit* slender, ribs very muricate above; pappus brownish-white.—DISTRIB. Europe.

SUB-GEN. 3. **Oporin'ia,** *Don* (gen.). *Pappus* of all the flowers 1-seriate, feathery, dilated at the base. *Buds* erect.

3. **L. autumna'lis,** *L.*; leaves glabrous lanceolate. *Apargia,* Willd.

Pastures and waste places; ascends to 3,000 ft. in the Highlands; fl. July–Sept. —Glabrous below, hispid above; rootstock truncate. *Leaves* 4–10 in., variable. *Scape* ascending, usually solitary, branched, rarely simple, bracteate; peduncles swollen above. *Heads* ½–1½ in. diam., involucre obconic or campanulate; bracts glabrous hispid or clothed with black hairs, outer subulate, inner linear obtuse. *Fruit* very slender, ribbed, slightly muricate; pappus brownish-white.—DISTRIB. Europe (Arctic), Siberia, W. Asia, Greenland; introd. in N. America.

VAR. 1, *autumna'lis* proper; involucre nearly glabrous.—VAR. 2, *praten'sis*, Koch (sp.); involucre clothed with (often black) woolly hairs. *Hedypnois Taraxaci*, Sm. Subalpine districts.

37. LACTU'CA, *L.* LETTUCE.

Erect, annual or perennial, leafy, branched herbs; juice milky. *Leaves* alternate, upper often sagittate. *Heads* corymbose, small, yellow, rarely purple or blue, few-flowered; involucre narrow, cylindric; bracts few, in several series; receptacle flat, naked. *Corollas* all ligulate; anther-cells shortly tailed; style-arms slender and upper part of style pilose. *Fruit* flattened, beak long slender; pappus of many soft, slender, silvery, fugacious hairs.—DISTRIB. Temp. regions of the N. hemisphere and S. Africa; species about 50.—ETYM. The classical name.

* *Leaves with the keel usually setose. Beak as long as the bordered fruit.*

1. **L. viro'sa,** *L.*; distantly scabrous, leaves spreading, radical obovate-oblong sinuate-toothed, cauline amplexicaul with deflexed auricles, branches of panicle long spreading, fruit black.

Hedgebanks and waste places, from Stirling and Perth southwards; rare in Scotland; absent from Ireland; fl. July–Aug.—Erect, 3–6 ft., prickly, glaucous, biennial. *Leaves* 6–18 in., green, radical petioled, often spotted with black; cauline oblong, hardly narrowed at the base. *Heads* ½–¾ in., pale yellow, in slender panicles, subsecund; peduncles slender, bracteate; involucre narrow conical; bracts few, green, tips red. *Fruit* with a thick cellular wing and ribbed faces.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Siberia.—Juice fœtid, milky, narcotic, used as an opiate.

2. **L. Scari'ola,** *L.*; rather scabrous below, leaves suberect, radical obovate-oblong sinuate-toothed or runcinate, upper sagittate amplexicaul, auricles acute spreading, branches of panicle long spreading, fruit grey.

Waste places, rare, Worcester, Norfolk, Essex, Kent, and Surrey; native? *Watson;* fl. July–Aug.—Closely allied to *L. viro'sa*, but prickly only towards the base; branches more erect; leaves usually more runcinate; heads smaller; fruit narrower.—DISTRIB. Europe, Siberia; introd. in N. America.—Possibly the origin of the garden lettuce.

3. **L. salig'na,** *L.*; almost glabrous, leaves entire or runcinate acute, cauline hastate amplexicaul, auricles spreading acute, uppermost narrow entire, branches of panicle very short erect, fruit grey.

Waste grounds, Suffolk to Sussex, especially near the sea, rare; fl. July–Aug.—A more slender plant than the preceding, much less bristly, with the flowers often fascicled on short erect branches so as to appear almost spiked.—DISTRIB. Europe from Holland southwards, N. Africa, W. Asia.

** *Leaves not setose. Beak shorter than the terete fruit.*

4. **L. mura'lis,** *Fresen.*; glabrous, leaves broad lyrate-pinnatifid, upper amplexicaul auricled often entire, branches of panicle slender diverging, fruit black. *Prenanthes muralis*, L.

Old walls and rocky copses, from Skye and Moray southwards, rare; ascends to 1,300 ft. in Yorkshire; doubtfully wild in Scotland; Wicklow and Louth in Ireland; fl. June–Aug.—Tall, slender, annual or biennial, 1–3 ft. *Leaves* membranous, glaucous below, narrow; radical with winged petioles, lobes few toothed; terminal lobe large, 3-angular, sinuate-lobed. *Heads* ¾ in.,

yellow; peduncles slender, bracteate; invol. bracts few, linear, green and purplish. *Fruit* ribbed and muricate.—DISTRIB. Europe, W. Asia.

38. TARAX'ACUM, *Juss.* DANDELION.

Perennial, scapigerous herbs; juice milky. *Leaves* all radical, entire or pinnatifid. *Heads*, solitary, yellow, scapes fistular leafless; invol. bracts imbricate; inner equal, erect; outer smaller, often recurved; receptacle flat, naked, pitted. *Corollas* all ligulate; anther-cells not tailed; style-arms slender and upper part of style pubescent. *Fruit* compressed, ribbed, muricate above the middle, abruptly beaked; pappus-hairs in many series, simple, white.—DISTRIB. All temp. and cold climates; species, one variable, or many.—ETYM. ταράσσω, from its *alterative* effects.

1. **T. officina'le**, *Wiggers;* leaves toothed sinuate or runcinate-pinnatifid. *Leontodon Taraxacum*, L.

Meadows and waste places; fl. March–Oct.—Glabrous or cottony at the crown and involucre. *Root* long, stout, black. *Leaves* oblong-obovate or spathulate, lobes usually toothed. *Scapes* 1 or more, ascending or erect. *Head* ½–2 in. broad, bud erect; involucre campanulate, outer bracts more or less recurved, inner erect. *Corollas* bright yellow, outer often brown on the back. *Fruit* brown, with a beak of equal length.—DISTRIB. Arctic and N. and S. temp. regions.—A well-known medicine.

VAR. 1, *Dens-leo'nis*, Desf. (sp.); leaves bright green runcinate-pinnatifid, outer bracts recurved, fruit pale slightly muricate. The common form most frequent in cultivated ground; ascends to 2,700 ft. in the Highlands.—VAR. 2, *erythrosper'mum*, Andrz. (sp.); leaves dull green often glaucous runcinate-pinnatifid, outer bracts spreading, inner appendiculate below the tip, fruit dark brown spinulose upwards. Dry places.—VAR. 3, *lævigà'tum*, DC. (sp.); leaves dull green pinnatifid, outer bracts erect broader, inner appendiculate or gibbous below the tip, fruit as in VAR. 2, but paler. Sandy places.—VAR. 4, *palus'tre*, DC. (sp.); leaves sinuate-toothed or pinnatifid, lobes broad, outer bracts ovate spreading or erect, inner simple at the tip, fruit pale spinulose upwards. Moist moorlands; ascends to 4,000 ft. in the Highlands.

39. CRE'PIS, *L.* HAWK'S-BEARD.

Branched herbs, juice milky. *Leaves* chiefly radical. *Heads* panicled or corymbose, small, yellow or purplish; invol. bracts many, linear, equal, with a few smaller at their base; receptacle flat, naked, pitted, margins of the pits hairy or toothed. *Corollas* all ligulate; anther-cells not tailed; style-arms slender and upper part of style pilose. *Fruit* terete, striate, beak long, short or 0; pappus-hairs in many series, slender, simple, white, silky, brown in *C. paludosa*.—DISTRIB. Europe, N. and W. Asia to the Himalaya; species about 90.—ETYM. The classical name.

SUB-GEN. 1. **Cre'pis** proper. *Peduncles* slender; buds erect. *Fruit* not beaked. *Pappus* white, silky.

1. **C. vi'rens**, *L.*; glabrous below, lower leaves toothed runcinate or lyrate, upper linear sagittate, inner bracts glabrous within as long as the pappus. *C. tectorum*, Sm. not L.

Waste and cultivated ground, cottage roofs, &c., ascending to 1,000 ft. in the Highlands; fl. June–Sept.—Annual, very variable. *Stems* 1 or more, 1–3 ft.

furrowed, much branched; inflorescence usually glandular hairy. *Leaves* often pinnatisect with narrow acute or obtuse lobes, petioled. *Heads* ½–¾ in. diam., campanulate; outer bracts subulate, inner linear. *Fruit* red-brown, ribs 10 or more, smooth.—DISTRIB. Europe from Denmark southwards, Canaries.

2. **C. bien'nis,** *L.*; hispid, leaves all runcinate lyrate, upper simple, sessile, inner bracts pubescent within shorter than the pappus.

Chalky pastures, from Leicester and Northampton southwards, rare; Dublin in Ireland; fl. June–July.—Biennial. *Stem* 1–4 ft., stout, channelled, ribbed. *Leaves* 6–10 in., lobes very irregular. *Heads* ¾–1 in. diam.; involucre campanulate, bracts glabrous externally, outer spreading. *Fruit* ¼ in., slender, twice as long as in *C. virens*, red-brown, ribs close set, prominent, rough.—DISTRIB. Europe.—Closely resembles *C. taraxacifolia*.

3. **C. hieracioi'des,** *Waldst.* and *Kit.*; glabrous or hairy, lower leaves oblong-spathulate, upper linear-oblong ½-amplexicaul, bracts with gland-tipped hairs. *C. succisæfolia*, Tausch.; *Hieracium molle*, Sm.

Mountain woods, from Yorkshire northwards to Dumbarton and Forfar; ascending to 1,200 ft. in Northumberland; not found in Ireland; fl. July–Aug.—Slender, perennial, variable in pubescence. *Leaves* 2–4 in., obtuse, entire or sinuate-toothed. *Heads* ¾–1 in. diam., few; involucre subcylindric; outer bracts appressed, short, about as long as the pappus. *Fruit* contracted at the base and tip, ribs many, smooth.—DISTRIB. Mid. Europe to the Caucasus.

SUB-GEN. 2. **Barkhau'sia,** *Mœnch* (gen.). *Peduncles* slender or thickened upwards. *Fruit* beaked, many-ribbed, minutely hispid.

4. **C. fœ'tida,** *L.*; hispid, stem branched from below, leaves runcinate-pinnatifid, peduncles bracteate incurved thickened upwards, buds drooping, invol. bracts tomentose inner hardening and enclosing the outer fruits.

Chalky and gravelly banks in England, rare, from Cambridge and Norfolk to Sussex and Kent; fl. June–July.—Annual or biennial. *Stem* 1–2 ft., terete, faintly furrowed, usually with many ascending corymbose branches. *Heads* ¾ in. diam., bright yellow; peduncles long; invol. bracts often setose and glandular, outer erect or spreading. *Fruit* yellow-brown, beak of outer shorter than the bracts, of inner longer.—DISTRIB. Europe from Belgium southwards, N. Africa.

5. **C. taraxacifo'lia,** *Thuill.*; hispid, stem branched above, leaves runcinate-pinnatifid, peduncles very slender not thickened, buds erect, inner invol. bracts not enclosing the outer fruits.

Dry banks and chalky pastures in S.E. England, local, from Yorkshire to Surrey, and in Carnarvon; fl. June–July.—Habit and foliage of *C. biennis*, biennial. *Stem* 1–2 ft., ribbed and furrowed. *Heads* ¾–1 in. diam.; involucre cylindric-campanulate, often glandular as well as tomentose, outer bracts spreading, not hardening. *Flowers* yellow, outer striped with brown on the back. *Fruits* yellow-brown, all long-beaked and very slender.—DISTRIB. W. Europe from Belgium southwards, N. Africa.

C. SETO'SA, *Haller*; hispid, lower leaves sinuate-toothed or runcinate-pinnatifid, upper amplexicaul, peduncles slender not thickened, buds erect, invol. bracts prickly, inner not enclosing the outer fruits.

Cultivated fields of clover in England, not naturalized even; fl. Aug.—Biennial. *Stem* 1–3 ft., erect, branched from the base, angled and furrowed, leafy.

Leaves very variable. *Peduncles* rigid, deeply grooved. *Heads* ½ in. diam., campanulate; involucre contracted in fruit; bracts very rigid, slender, keeled, outer subulate spreading, inner linear shorter than the pappus, hardening. *Fruits* all slender with long beaks.—DISTRIB. Mid. and S. Europe.

SUB-GEN. 3. **Ara'cium,** *Monn.* (gen.). *Peduncles* very slender; buds erect. *Fruit* slender, not beaked, many-ribbed, quite smooth. *Pappus* of dirty-white fragile hairs.

6. **C. paludo'sa,** *Mœnch;* radical leaves obovate-lanceolate, petiole slender, cauline sessile amplexicaul auricled. *Hieracium paludosum,* L.

Moist mountain meadows, copses, &c. from S. Wales and Leicester northwards; ascending to near 2,000 ft. in the Highlands; N. of Ireland; fl. July-Sept. —Perennial; glabrous, inflorescence, covered with black glandular hairs. *Stem* 1–3 ft., slender, furrowed. *Leaves* membranous, runcinate-toothed, long-acuminate; radical 3–5 in.; cauline contracted in the lower third. *Heads* few, ¾–1 in. diam., corymbose; bracts of peduncles minute, subulate with toothed bases; ligules yellow; styles livid. *Fruit* cylindric, deeply grooved, strongly ribbed, obscurely contracted at the top, pale.—DISTRIB. Europe (Arctic), excl. Turkey, W. Siberia.—Intermediate between *Hieracium* and *Crepis,* having the pappus of the former and all other characters of the latter.

40. SON'CHUS, *L.* SOWTHISTLE.

Annual or perennial, often succulent brittle herbs; juice milky. *Leaves* alternate, toothed or pinnatifid. *Heads* corymbose or subumbellate, yellow; involucre conical after flowering, scales in many series, imbricate; receptacle flat, naked, pitted. *Corollas* all ligulate; anther-cells shortly tailed; style-arms slender, and upper part of style hairy. *Fruit* truncate, much compressed, grooved, ribbed, usually transversely rugose, pappus-hairs in many series, simple, silky.—DISTRIB. N. and S. temp. regions; species about 40.—ETYM. doubtful.

1. **S. arven'sis,** *L.*; rootstock creeping stoloniferous, leaves sharply toothed, lower runcinate, upper oblong-lanceolate ½-amplexicaul, auricles obtuse, inflorescence glandular-hispid.

Cultivated fields, ascending to near 1,000 ft. in Northumberland; fl. Aug.–Sept.—*Stem* 2–4 ft., tubular, angled, simple or branched. *Leaves* very variable, margin waved, almost spinous; glaucous below. *Heads* 1–2 in. diam.; involucre broadly campanulate. *Fruit* light-brown.—DISTRIB. Europe (Arctic), N. Africa, temp. Asia; introd. in America.

2. **S. palus'tris,** *L.*; rootstock branched, leaves minutely toothed, lower runcinate with few segments, upper entire sessile sagittate, auricles acute, inflorescence glandular-hispid.

Marshes in England, very rare; formerly found in Suffolk, Huntingdon, Kent, and Essex, now all but extinct except on the Thames below Woolwich; fl. Oct.—*Stem* 5–7 ft., strict, stout, tubular, angled, leafy. *Leaves* long-acuminate, lower very large and long, often reduced to one sagittate blade and a broad winged petiole, very glaucous beneath. *Heads* ¾–1 in. diam., pale yellow, subumbellate; peduncles stout, very hispid and glandular. *Fruit* 4-ribbed, pale.—DISTRIB. Europe from Denmark southwards.

3. **S. olera'ceus,** *L.*; annual, leaves sharply toothed entire or pinnatifid lanceolate ½-amplexicaul, auricles rounded, inflorescence subumbellate glabrous rarely glandular.

Fields and waste places, ascending to 1,200 ft. in Yorkshire; fl. June–Sept.—*Stem* 2–3 ft., erect, usually branched, tubular, grooved. *Leaves* sessile or petioled, bright green, glaucous, usually much lobed, often spinous-toothed. *Heads* crowded, ¾–1 in. diam.; peduncles sometimes cottony. *Fruit* pale brown.—DISTRIB. Europe, N. and W. Asia, N. Africa, apparently wild in S. Australia and New Zealand; introd. in America.—Sometimes used as a pot-herb by peasants.

Sub-sp. OLERA'CEUS proper; fruit ribbed and transversely wrinkled.

Sub-sp. AS'PER, *Hoffm.* (sp.); leaves waved spinous, auricles suborbicular deflexed and recurved, fruit ribbed but not transversely wrinkled.

41. MULGE'DIUM, *Cassini.* BLUE SOWTHISTLE.

Erect, perennial, usually branching herbs; juice milky. *Leaves* alternate, entire or pinnatifid. *Heads* corymbose, blue; involucral bracts many, imbricate, outer smaller; receptacle flat, naked, pitted. *Corollas* all ligulate; anther-cells simple or tailed; style-arms slender and upper part of style pilose. *Fruit* compressed, ribbed, with a scabrid disk; pappus-hairs in many series, rigid, simple, dirty white.—DISTRIB. N. temp. and Arctic regions; species about 20.—ETYM. *mulgere*, from the milky juice.

1. **M. alpi'num,** *Less.*; leaves sagittate lyrate or runcinate toothed, terminal lobe very large deltoid. *Sonchus alpinus*, L.; *S. cæruleus*, Sm.

High wet alpine rocks in Forfar and Aberdeen, between 2,000 and 3,000 ft.; fl. Aug.—Glabrous except the glandular-pilose inflorescence. *Stem* 3–4 ft., simple, stout, succulent, grooved. *Leaves* 4–8 in. broad, membranous, narrowed into ½-amplexicaul auricled winged petioles; upper broadly ovate or triangular-cordate, acute, shortly petioled. *Heads* 1 in. diam., pale blue, in erect simple or branched racemes; peduncles ascending, bracteate; involucre subcylindric, bracts linear. *Fruit* 4-gonous, slightly compressed. —DISTRIB. Arctic and Alpine Europe, W. Siberia.

42. HIERA'CIUM, *L.* HAWKWEED.

Perennial herbs of various habit, often covered with glandular or stellate hairs; juice milky. *Leaves* chiefly radical; cauline alternate sessile. *Heads* yellow, rarely orange, solitary corymbose or panicled; involucral bracts many, imbricate, unequal; receptacle flattish, naked, pitted, margins of the pits toothed or hairy or fimbriate. *Corollas* all ligulate; anther-cells not tailed; style-arms slender, and upper part of style pilose. *Fruit* angled or striate, not beaked; pappus-hairs 1-seriate simple, rigid, unequal, tawny or brownish, brittle, often surrounded at the base with a short crenulate ring.—DISTRIB. N. temp. and Arctic regions; species 20 or more.—ETYM. ἱέραξ, *a hawk.*

In the following attempt to classify the British forms of *Hieracium*, I have been guided by Mr. J. G. Baker. I believe that there are no characters whereby the 9 forms here regarded as species, from *alpinum* to *boreale* inclusive, can be more than approximately defined; of these 9 Bentham makes 4, and Backhouse (regarding a considerable amount of constancy under cultivation as a test of specific value) makes 30. Variable as the genus is, it is a curious

fact, that the sequence of the species is so obvious as to have been recognised by all botanists; and that this sequence represents to a very considerable extent the spread of the species in altitude and area in the British Isles.

SECTION 1. **Piloselloi'dea.** Rootstock stoloniferous. *Stem* scape-like. *Invol. scales* irregularly imbricate. *Ligules* glabrous. *Fruit* minute, furrowed, crowned with a crenate disk; pappus-hairs slender, equal.

1. **H. Pilosel'la,** *L.*; stolons long, scape leafless, heads solitary, invol. bracts acute, ligules pale yellow, styles yellow. *Mouse-ear Hawkweed.*

Banks, wall-tops, &c.; ascends to 2,400 ft. in Yorkshire; fl. May–Aug.—Villous with long soft hairs. *Stolons* creeping. *Leaves* 2–4 in., oblong-lanceolate or obovate-spathulate, stellately downy beneath. *Scapes* 2–10 in., with 1–3 leaves or 0. *Heads* ½–1 in. diam.; involucre subcampanulate and top of scape stellately downy and with glandular hairs; ligule often striped with brown on the back. *Fruit* $\frac{1}{10}$ in., dark.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.

VAR. *Pelete'rianum,* Mer. (sp.); more densely silky, stolons shorter, heads larger. *H. pilosissimum,* Fries.

H. AURANTI'ACUM, *L.*; rootstock creeping, stolons short or 0, heads corymbose, invol. bracts obtuse, ligules orange, styles brown.

Naturalized in copses in the N. of England and Scotland; fl. June–July.—A larger plant than *H. Pilosella;* leaves not pubescent below; flowers orange-red.—DISTRIB. Scandinavia, and Pyrenees to the Carpathians.

2. **H. colli'num,** *Frics;* stolons short, scape slender laxly hairy below, involucre floccose and covered with glandular black hairs, heads small corymbose, invol. bracts linear obtuse, ligules pale yellow.

Ettrick river, between Selkirk and Philiphaugh; fl. June.—*Rootstock* 1–2 in., oblique, truncate, with several short branches, the outer being stolons. *Leaves* 2–3 in., narrow oblong- or spathulate-lanceolate, subacute, narrowed into petioles, quite entire, covered like the scape below with long flexuous scattered (tawny when dry) hairs or setæ with bulbous bases, slightly stellately downy beneath. *Scape* 10–14 in., with one sessile narrow leaf below the middle. *Heads* ½ in., rather crowded; involucre cylindric-campanulate.—DISTRIB. Scandinavia (Arctic).—Probably the *H. Auricula,* L., found in Westmoreland by Hudson (*H. dubium,* "Flora Danica," t. 1,044).

SECTION 2. **Pulmona'rea.** *Stolons* 0. *Rootstock* with a persistent rosette of leaves. *Stem* or *scape* naked or 1–few-leaved. *Invol. bracts* irregularly imbricate. *Ligules* hairy at the back and tip, or tip only. *Fruit* short, furrowed, without a crenate disk; pappus-hairs rigid, unequal.

3. **H. alpi'num,** *L.*; green, not glaucous, softly pilose and shaggy, scape 4–10 in. with 1–2 small leaves or 0, invol. bracts softly silky, outer lax or spreading, ligules hairy on the back or tip.

Alps of Aberdeen and Forfar, alt. 2,000–4,000 ft., rare; Breadalbane Mts., Ben Nevis, and in Cumberland; absent from Ireland; fl. July–Aug.—*Heads* 1–1½ in. diam., bright or pale yellow.—DISTRIB. N. and Arctic Europe, Asia, and America, Alps of Mid. and S. Europe, exclusive of Pyrenees.—A scarce plant: the following varieties appear to be very local.

VAR. 1, *melanocephalum,* Tausch. (sp.).; leaves lanceolate or spathulate nearly glabrous above, head solitary, invol. hemispheric, hairs black, bracts all

acute, outer lax, style yellow. *H. alpi'num*, Backh. Scotland.—VAR. 2, *holoseric'eum*, Backh. (sp.); leaves as in VAR. 1, or lanceolate but obtuse entire and pilose on both surfaces, heads solitary, invol. turbinate, hairs long white, outer bracts broad obtuse, inner acute appressed, style yellow. Scotland and Cumberland.—VAR. 3, *exim'ium*, Backh. (sp.); taller, 6–15 in., leaves lanceolate hairy on both surfaces, heads 1 or few, invol. truncate below, hairs black, bracts many slender acute, style yellow or livid. Scotland.—VAR. 4, *calendulifo'rum*, Backh. (sp.); stem simple or branched, leaves broadly obovate obtuse toothed, primordial orbicular, invol. rounded at the base, hairs silky black, bracts acute, style livid. Cumberland and Scotland. The handsomest form, indicating a passage to *H. nigrescens*.

4. **H. nigres'cens**, *Willd.*; more or less covered with scattered soft hairs, scape 6–18 in. with 1–2 small leaves or 0, involucre villous, hairs black glandular, outer bracts lax, ligules glabrous or nearly so.

Alps of Scotland and Cumberland; ascends to 4,500 ft.; absent from Ireland; fl. Aug.–Sept.—Quite intermediate between *H. alpinum* and *Lawsoni* in size, altitudinal distribution, and area. Usually larger and more slender than *alpinum*, with broader, narrower, coarsely toothed leaves, much shorter soft hairs, and blacker bristles and glands on the involucre; heads as large.

VAR. 1, *pulmona'rium*, Sm. (sp.); leaves with large irregular teeth, cauline few, involucre dark green ovoid at the base, bracts rather broad outer obtuse, tips woolly, flowers deep yellow, style dark. *H. nigrescens*, Backh. Alps of Scotland, ascending to 3,000 ft.—VAR. 2, *gracilen'tum*, Backh. (sp.); green, root-leaves lanceolate, cauline few large, involucre ventricose black with soft hairs and glands, bracts broad woolly at the tips, ligules nearly glabrous on the back, styles livid. Scotland. Very near *alpinum* indeed.—VAR. 3, *globo'sum*, Backh. (sp.); glaucous or green, radical leaves ovate, cauline few small bract-like or 0, buds globose, heads large, involucre rounded at the base at last spherical, bracts appressed, styles yellow. Cairngorm range.—VAR. 4, *chrysan'thum*, Backh. (sp.); green, radical leaves ovate sharply coarsely toothed long-petioled, cauline minute narrow petioled, involucre rounded at the base, hairs and glandular hairs short, bracts many, styles yellow or faintly livid. *H. rupestre*, Bab. Frequent in Scotland, rare in Cumberland.—VAR. 5, *senes'cens*, Backh. (sp.); green, radical leaves lanceolate evenly toothed, cauline linear-lanceolate petioled, heads 2 or more, involucre ovoid at the base, bracts woolly at the tip incurved in bud, styles yellow. Scotch Alps.—VAR. 6, *lingula'tum*, Backh. (sp.); green, 15–24 in., radical leaves few toothed coarsely hairy above, petioles short, cauline few sessile, heads several, involucre broad at length truncate at the base, dark with hairs, bracts straight in bud, styles livid. *H. saxifragum*, Bab.; *H. divaricatum*, Don. Scotch mountains, ascending to 2,500 ft.

5. **H. Lawso'ni**, *Sm.* (not *Villars*); glaucous green, 1–2 ft., stem more or less leafy slightly hairy or glabrous below, radical leaves ovate-lanceolate, petioles shaggy, cauline oblong or ovate broad sessile amplexicaul, heads 1–5 1–1½ in. diam., ligules many, styles livid.

Mountain districts of England, Scotland, and Ireland; ascending to 2,700 ft.; not found in Wales; fl. July–Aug.—A handsome species, best characterised by its size, ovate-lanceolate leaves, shaggy petioles, several (rarely 1) large bright-coloured heads, and livid styles.—DISTRIB. Pyrenees.

Sub-sp. ANG'LICUM, *Fries* (sp.); petioles long shaggy winged, cauline leaves

1-2 ovate, heads 2–5, involucre ventricose rounded at the base, bracts slender, ligules pilose at the tip. *H. cerinthoides*, Backh. not L.

Sub-sp. I'RICUM, *Fries* (sp.); more robust and leafy, radical leaves in a less marked rosette or scattered, petioles shorter, cauline broadly ovate not contracted above the base, involucres truncate at the base constricted after flowering, ligules glabrous. *H. Lapeyrousii*, Bab. not Frœl. This, which is confined to Great Britain, bears much the same relation in foliage to *anglicum* that *tridentatum* does to *vulgatum*.

6. **H. muro'rum,** *L.*; green or glaucous, stem 1–2 ft. glabrous or nearly so below, primordial leaves suborbicular, radical in a distinct rosette ovate cordate or rounded at the base entire or toothed, cauline 0 or very few, heads 2–6 ¾–1 in. diam., peduncles floccose and covered with scattered simple and gland-tipped hairs.

Woods, heaths, walls and rocks; ascends to 2,000 ft.; fl. July–Sept.—This is the commonest *Hieracium* of Britain except *Pilosella* and *sylvaticum*, and best distinguished from the preceding by the smaller heads and less robust habit; and from *H. nigrescens* by its large size and less villous or hairy stem and involucres; but there is every transition between these and the following.—DISTRIB. Europe (Arctic), Siberia, W. Asia to N.W. India, N. America.—I can make nothing of the following sub-species and varieties, which are adopted from Backhouse's monograph.

Sub-sp. MURO'RUM proper; green, radical leaves toothed slightly hairy, petioles slender, cauline often large and petioled, heads many small, peduncles short, involucre rather ventricose more or less villous with black and gland-tipped hairs, styles livid or yellow. The common form.—VAR. 1, *nitid'um*, Backh. (sp.); radical leaves dark green lanceolate coarsely toothed, involucre more ventricose, style yellow. Aberdeen alps. The passage to *H. nigrescens*.—VAR. 2, *aggrega'tum*, Backh. (sp.); radical leaves broader obtuse toothed below, glabrous or hairy beneath and ciliate, cauline subsessile, peduncles erect crowded umbellate and narrow turbinate involucres densely floccose, bracts obtuse. Aberdeen alps.

Sub-sp. PAL'LIDUM, *Backh.* (sp.); very glaucous, radical leaves ovate or lanceolate conspicuously fringed with long hairs, cauline sessile or the lower petioled, heads 2–6, involucre ventricose ovoid at the base constricted above with few simple or gland-tipped hairs, bracts appressed acute, styles yellow. England, Scotland, and Ireland, 1,000–2,000 ft. Very near *H. anglicum*.—VAR. 1, *cineras'cens*, Jord. (sp.); still more hairy and glaucous, stem pilose fragile, peduncles and involucres more densely setose and hoary. *H. lasiophyllum*, Backh.—VAR. 2, *argen'teum*, Fries (sp.); very glaucous, almost glabrous, stem fragile tubular and subentire radical leaves almost glabrous, cauline sessile or the lower stalked, peduncles long rigid and small involucres with scattered hairs.

Sub-sp. CÆ'SIUM, *Backh.* (sp.); dull glaucous-green, radical leaves coriaceous usually narrowed to a toothed base, glabrous above, cauline 0 or very small and sessile, heads few large, involucre subglobose almost glandless and less hairy hoary with stellate down, ligules bright yellow glabrous, styles livid. Yorkshire and Scotch Mts. Forms the passage to *H. sylvaticum*.—VAR. 1, *Gibso'ni*, Backh. (sp.); stem wiry often forked, radical leaves broadly ovate, base obtuse, teeth small spotted with purple, petioles slender short, peduncles rigid floccose and setose, invol. bracts short broad obtuse margins downy, styles yellow. *H. hypochœroides*, Gibson. Yorkshire on mountain limestone (this I have not seen).—VAR. 2, *flocculo'sum*, Backh. (sp.); ashy-green,

stem floccose throughout rather leafy, radical leaves more or less toothed narrowed into long petioles stellately downy on both surfaces, cauline large ½-amplexicaul, involucre ovoid hoary with whitish hairs, bracts acuminate. *H. stelligerum*, Backh. not Frœl. Clova Mts.—VAR. 3, *obtusifo'lium*, Backh. (sp.); yellow-green, stem 1-leaved, petioles densely villous, peduncles spreading, involucres ventricose truncate at the base, ligules pilose at the tips. *H. cæsium*, var. *'obtusifolium*, Bab. Clova Mts.

7. **H. sylvat'icum,** *Sm.*; green or glaucous, stem 1–3 ft. nearly glabrous below, primordial leaves lanceolate, radical petioled distinctly alternate lanceolate sharply toothed or subpinnatifid, teeth pointing forwards, cauline 2–8, heads ¾–1 in. diam. panicled or corymbose and peduncles floccose and with simple and gland-tipped hairs rarely naked, ligules glabrous, styles livid.

Banks and copses especially in hilly districts; ascending to 3,500 ft. in the Highlands; rare in Ireland; fl. July–Sept.—Very variable, best distinguished from *H. murorum* by the narrower leaves less crowded in a rosette, and more leafy stem; but some vars. of *murorum*, as *cæsium* and *nitidum*, would rank with this in form of foliage. The more leafy states, as *gothicum* and *tridentatum*, show a passage to *boreale* and *crocatum*.—DISTRIB. Europe (Arctic), Siberia, Dahuria, N. America.

Sub-sp. VULGA'TUM, *Fries* (sp.); green or glaucous, stem 1–1½ ft. hardly leafy, radical leaves petioled in a persistent loose rosette toothed in the middle or nearly entire often spotted, cauline petioled upper sessile, heads many, peduncles straight, involucre cylindric in bud floccose and with gland-tipped hairs, bracts equal alternate subacute. *H. maculatum*, Sm. Very common.—VAR. 1, *cinereum*, Backh.; ashy green or glaucous, stem branched, radical leaves few, cauline subentire, heads nearly glabrous, bracts broad more obtuse. Orme's Head.—VAR. 2, *rubes'cens*, Backh.; green, stem robust purplish, leaves ovate, cauline 1–2, heads few large, bracts broad subacuminate. Settle, Yorkshire.

Sub-sp. GOTH'ICUM, *Fries* (sp.); dark green, stem 2–4 ft. rigid slender leafy simple or branched above, radical leaves withering in summer shortly petioled, cauline ovate or lanceolate acute toothed in the middle, upper sessile, heads small few, involucres subglobose dark green glabrous or nearly so, bracts imbricate broad obtuse, ligules glabrous, styles yellow or with livid hairs.—Subalpine districts of York, Wales, Scotland, and Ireland; ascending to 1,000 ft.—Very distinct at first sight, but intermediates occur with *H. sylvaticum*, as also with *boreale*.—DISTRIB. N.W. Europe.

Sub-sp. TRIDENTA'TUM, *Fries* (sp.); green, stem 2–5 ft. rigid leafy subcorymbosely branched, radical leaves 0 or withering in summer obtuse, cauline ovate or lanceolate sparingly toothed in the middle acute rounded at the base, branches and peduncles slender leafless, involucre constricted in the middle after flowering.—Hilly districts of N. of England, ascending to 1,200 ft., also in Cheshire, Surrey, Sussex, and Kent; not found in Ireland.—DISTRIB. Europe from Norway to Italy and Turkey.—This forms the passage to the *Accipitrina* group, and should perhaps be referred there.

SECTION 3. **Accipitri'na.** *Stolons* 0. *Rootstock* without radical leaves, forming in autumn closed buds that produce leafy stems the following year. *Stem* erect, very leafy. *Invol. bracts* imbricate in 2 or many series. *Ligules* glabrous or minutely pilose at the tip. *Fruit* short, furrowed, without a crenate disk; pappus-hairs rigid, unequal.

8. **H. prenanthoi'des,** *Villars;* stem 2–3 ft., branches spreading, leaves oblong or linear-oblong reticulate and glaucous below minutely toothed, lower with amplexicaul petioles, upper cordate and auricled, heads in branched leafy corymbose panicles usually thickly clothed with black gland-tipped hairs, peduncles short floccose, ligules pilose at the tip, styles dark or yellowish.

Subalpine regions of N. England and Scotland, ascending to 2,400 ft.; Wicklow only in Ireland; fl. Aug.–Sept.—*Stem* rigid, hairy or glabrous, leafy, often much branched. *Leaves* ciliate, hairy on both sides. *Peduncles* spreading short, hoary. *Heads* ½ in. diam.; involucre cylindric in bud; bracts few, outer short.—DISTRIB. Europe (Arctic and Alpine), Siberia.

Sub-sp. STRIC'TUM, *Fries* (sp.); stem hollow, leaves glaucous scarcely amplexicaul lower lanceolate, peduncles erect or ascending longer straighter and involucres more glabrous, ligules almost glabrous at the tip. *H. denticulatum*, Sm.; *H. Borreri*, Syme.—Intermediate between *prenanthoides* and *crocatum*, next to which Syme places it.

9. **H. umbella'tum,** *L.*; stem 1–2 ft. wiry hairy or shaggy below, leaves narrowly linear or oblong-lanceolate sessile narrowed at the base toothed, heads subumbellate and peduncles stellately downy but hairless, bracts many, tips recurved, ligules glabrous, styles yellow.

Thickets, &c. in dry and rocky places, from Berwick and Kirkcudbright southwards, ascending to 1,200 ft. in Yorkshire; local in Ireland; fl. July–Sept.—Usually very distinct, from its short stem, wiry habit, many narrow leaves, large subumbellate glabrous heads and recurved bracts, but varieties pass into *crocatum*. *Leaves* generally uniform throughout the plant, tooth small distant, reticulate, stellately downy beneath. *Involucre* ovoid or subcylindric, dark or pale; peduncles slender, rigid, bracteate.—DISTRIB. Europe (Arctic), Siberia to Kamtschatka, W. Asia to the N.W. Himalaya, E. and W. N. America (*H. canadense*, Fries).

VAR. *filifo'lium*, Backh.; stem leafy throughout, leaves very narrow margins revolute quite entire. Lough Neagh.

10. **H. croca'tum,** *Fries;* stem 2–4 ft., glabrous or pilose, branches spreading erect or ascending, leaves lanceolate or oblong sessile rounded or truncate at the base toothed or entire often glaucous below, heads few or many and peduncles downy glabrous or hairy, bracts appressed obtuse, ligules glabrous, style livid or yellow, pappus almost white or discoloured.

Mountain districts, from York and Durham northwards; ascending to 1,200 ft.; E. and N.E. of Ireland, rare; fl. July–Sept.—Intermediate between *umbellatum* and *boreale*.—DISTRIB. Arctic, Northern, and Mts. of Mid. Europe.

Sub-sp. INULOI'DES, *Tausch.* (sp.); branches erect or ascending, leaves linear-lanceolate entire or toothed glabrous above hairy beneath, nerves indistinct, heads few, involucres generally glabrous.—Teesdale, Scotch alps, Antrim and Connemara.

Sub-sp. CORYMBO'SUM, *Fries* (sp.); branches spreading or ascending, leaves ovate irregularly toothed hairy above, glaucous and loosely reticulate beneath, heads many, involucre ultimately truncate sparsely hairy, pappus tawny. *H. rigidum*, Backh. not Fries.—Scotch alps, Yorkshire, and Antrim.—Leaves of *H. boreale*, but upper amplexicaul, more glaucous and nerved.

11. **H. borea'le,** *Fries;* stem 2–4 ft., very hairy below stellately downy above, branches erect or ascending, leaves broad at the base ovate or ovate-

lanceolate toothed lower petioled upper broader sessile, heads many in leafy bracteate panicles or corymbs, peduncles floccose, involucre ovoid dark nearly glabrous, bracts broad obtuse, ligules glabrous, style livid or darker. *H. sabaudum*, Sm.; *H. heterophyllum*, Bladon.

Hedgebanks and margins of woods, common on railway banks; rarer in Scotland; fl. Aug.-Oct.—*Stem* often reddish, leafy throughout. *Leaves* with teeth pointing forwards, lowest with villous petioles. *Heads* ¾–1 in. diam.—DISTRIB. Mid. and S. Europe, rare in Scandinavia.—Allied to *gothicum*, but without radical leaves, heads smaller, invol. bracts more numerous.

ORDER XLIII. **CAMPANULA'CEÆ** (*including* **LOBELIA'CEÆ**).

Herbs, rarely shrubs; juice milky. *Leaves* alternate, exstipulate. *Calyx* ½ or wholly superior; limb 5-cleft. *Corolla* epigynous, usually persistent, tube entire or cleft posteriorly; limb regular or oblique or 2-labiate, 5-lobed, valvate or induplicate in bud. *Disk* 0 or tumid. *Stamens* 5, epigynous or epipetalous, filaments free or subconnate; anthers conniving round the style, basifixed, free or cohering, equal or unequal, naked or tipped with a pencil of hairs; pollen spherical or oblong. *Ovary* 2–8-celled; style simple, tipped with a ring of hairs or clothed with deciduous hairs; stigmas 2–8, hairy on the back, glandular internally, coherent till protruded beyond the anthers, then spreading; ovules many, axile, horizontal, anatropous, placentas fleshy. *Fruit* 2- or more-celled, a berry, or a capsule dehiscing above or below the calyx-limb by pores or valves, many-seeded. *Seeds* minute, testa usually pitted, albumen fleshy; embryo subcylindric. —DISTRIB. All regions, most abundant in temp. climates; genera 55; species 800.—AFFINITIES. With *Goodeniaceæ*, and *Cichoraceæ*.—PROPERTIES. Acrid and often poisonous, diuretic.

SUB-ORDER I. **Lobelia'ceæ.** *Corolla* irregular. *Anthers* cohering in a tube. 1. Lobelia.

SUB-ORDER II. **Campanule'æ.** *Corolla* regular. *Anthers* usually free.
Corolla campanulate, segments broad.....2. Campanula.
Corolla-segments linear. Anthers free.....3. Phyteuma.
Corolla-segments linear. Anthers connate.....4. Jasione.

1. LOBE'LIA, *L.*

Perennial herbs. *Flowers* in terminal racemes. *Calyx-tube* ovoid or obconic, limb 5-fid. *Corolla* very irregular; tube split at the back; limb 2-labiate, 2 upper lobes smaller erect or recurved, 3 lower pendulous. *Stamens* 5, epipetalous; anthers connate, all, or the 2 lower only, bearded at the tip. *Ovary* 2–3-celled; style filiform, included, girt with a ring of hairs, stigmas 2 broad spreading. *Capsule* 2–3-celled, top exserted and loculicidally 2–3-valved. *Testa* pitted.—DISTRIB. All but very cold regions; species about 200.—ETYM. *Mathias Lobel*, a Flemish botanist.

1. **L. Dortman'na,** *L.*; leaves all radical submerged subcylindrical 2-fistular, scape slender cylindric fistular, flowers drooping.

Gravelly mountain lake-bottoms, Scotland, ascending to 1,650 ft.; Cumberland, Wales, Shropshire, and Ireland; fl. July–Aug.—*Rootstock* short, stoloni-

ferous; root-fibres white, cellular. *Leaves* 2–3 in., linear, obtuse, recurved. *Scape* 1–2 ft., bracteate near the base; raceme lax, emersed. *Flowers* ¾–1 in., pedicelled; bracts short, oblong, obtuse. *Calyx* obconic, terete; lobes short, obtuse. *Corolla* pale lilac; lobes linear obtuse, upper erect, lower longer. *Anthers* included. *Capsule* clavate, inclined.—DISTRIB. N. Europe from W. France to Mid. Russia, N. America.

2. **L. u'rens,** *L.*; stem leafy, leaves obovate or oblong-spathulate obtuse sinuate-toothed, upper linear decurrent, flowers erect or spreading. Heaths near Axminster; fl. Aug.–Sept.—Glabrous or puberulous. *Stem* 1–2 ft., erect, slender, angular. *Leaves* 2–3 in., subsessile, teeth callous. *Racemes* 4–8 in., pedicels very short; bracts lanceolate, exceeding the 5-angled narrow obconic calyx. *Flowers* ⅓ in. *Calyx-lobes* subequal, subulate, shorter than the tube. *Corolla* blue or purple; lobes subequal, lanceolate, acute. *Capsule* erect.—DISTRIB. W. France, Spain, Madeira.—Acrid and pungent.

2. CAMPAN'ULA, *L.*

Perennial, rarely annual herbs. *Radical leaves* usually petioled, cauline alternate. *Flowers* spiked or racemed, white blue or lilac. *Calyx-tube* ovoid or subglobose; limb 5-fid, lobes flat or folded at the sinus. *Corolla* campanulate or rotate, 5-lobed. *Stamens* 5, epigynous, filaments short, bases broad dilated; anthers linear, free. *Ovary-cells* 3–5, opposite the sepals; style clavate, with rows of deciduous hairs opposite the anther-cells, stigmas 3–5 filiform. *Capsule* ovoid or turbinate, 3–5-celled, cells dehiscing below or above the calyx-limb by pores or valves. *Seeds* usually flattened.—DISTRIB. All temp. and most trop. climates; species about 200. —ETYM. *campanula*, from the *bell*-shaped corolla.

SUB-GEN. 1. **Campan'ula** proper. *Corolla* campanulate. *Capsule* wholly inferior, opening by valves or pores below the calyx-limb.

* *Stem-leaves linear or linear-lanceolate, usually nearly entire. Terminal flower of the raceme opening first.*

1. **C. rotundifo'lia,** *L.*; glabrous, stem angled slender, lower cauline leaves lanceolate, upper narrow linear quite entire acute, flowers racemed drooping, corolla broadly campanulate, lobes short recurved. *Hare-bell.* Pastures heaths and wall-tops, especially in hilly regions; ascending to 3,500 ft. in the Highlands; rather local in Ireland; fl. July–Sept.—Glabrous or slightly pubescent. *Rootstock* slender. *Stem* ½–2 ft., ascending, simple or branched, sparingly leafy. *Primordial leaves* long-petioled, broadly ovate-cordate, crenate. *Racemes* few or many-flowered; pedicels slender, bracts minute or 0; buds erect. *Calyx-lobes* erect, subulate. *Corolla* ½–1 in., blue, sometimes white, lobes subacute. *Capsule* subglobose, valves basal.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, E. and W. N. America.

VAR. 1, *rotundifo'lia* proper; cauline leaves all slender, flowers many.—VAR. 2, *monta'na,* Syme; lower cauline leaves oblong-lanceolate, flowers subsolitary.

2. **C. Rapun'culus,** *L.*; hispid or glabrous, stem angled, cauline leaves oblong- or obovate-lanceolate obscurely toothed, flowers panicled erect, calyx-lobes very long subulate, corolla broadly campanulate 5-lobed almost to the middle, lobes recurved.

Gravelly roadsides and hedgebanks from Stafford southwards; fl. July–Aug. —Biennial; root fleshy. *Stem* 2–3 ft., simple or branched. *Leaves* 1–3 in., variable, sessile; primordial broadly ovate, long-petioled. *Pedicels* slender. *Calyx-lobes* 1 in. after flowering. *Corolla* ¾ in., red purple or blue. *Capsule* short, erect, valves close under the calyx-lobes.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Siberia.

3. **C. pat'ula,** *L.*; scabrid, stem slender angled, cauline leaves linear or lanceolate, flowers subcorymbose erect, calyx-lobes linear, corolla broadly campanulate 5-lobed to the middle, lobes spreading.

Copses and hedges, rare, from York and Westmoreland to Dorset and Hants, chiefly in the W. counties; fl. July–Sept.—Variable in duration; root slender. *Stem* 1–3 ft., branched above. *Radical leaves* obovate or oblong, petioled, obscurely crenate, cauline subsinuate. *Pedicels* long slender. *Calyx-tube* obconic, lobes very variable in width. *Corolla* 1–1½ in. diam., purple. *Capsule* erect, obconic, valves close under the calyx-lobes.—DISTRIB. Europe, W. Siberia.

C. PERSICIFOLIA, *L.*; glabrous, stem terete, leaves coriaceous, cauline linear-oblong obtuse finely serrate, flowers few racemed, calyx-lobes triangular-lanceolate, corolla-tube hemispheric, lobes short erect.

Naturalized in woods near Cullen, Banffshire, and Thorp Arch, Yorkshire; fl. July–Aug.—Perennial. *Rootstock* creeping, branched, stoloniferous. *Leaves* 1–3 in., radical spathulate-lanceolate, sessile, nerves obscure. *Pedicels* stout, 2-bracteolate at the base. *Calyx-tube* small, subglobose; lobes broader than in the preceding species and coriaceous. *Corolla* 1 in. diam., blue, sometimes white. *Capsule* erect, ovoid, pores large under the calyx-lobes.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.

** *Stem-leaves ovate, toothed or serrate.*

4. **C. latifo'lia,** *L.*; pubescent, stem tall stout furrowed, cauline leaves oblong-ovate, lower petioled, upper sessile obtusely serrate, flowers large, lower bracts large leafy.

Copses and woods, from Moray and Isla to Surrey and Gloucester; ascends to 1,200 ft. in Yorkshire; S.E. of Ireland? fl. July–Aug. —*Rootstock* stout, woody. *Stem* 3–4 ft. *Radical leaves* long-petioled, triangular-cordate, hispidly pubescent beneath. *Raceme* very leafy; flowers many, erect or inclined. *Calyx-tube* broad, short, 5-ribbed; lobes large, ovate-lanceolate. *Corolla* blue or white, lobes suberect, acuminate. *Capsule* short, valves basal.—DISTRIB. Europe (Arctic), W. Siberia, W. Asia to the N.W. Himalaya.

5. **C. rapunculoi'des,** *L.*; puberulous, stem tall nearly terete, cauline leaves ovate, lower petioled, upper sessile obtusely serrate, flowers large, bracts all small linear.

Cultivated fields, from Fife (where it is a weed) southwards to Bedford; rare and local; an alien or denizen, *Watson;* fl. July–Aug.—*Rootstock* creeping; stolons subterranean. *Stem* 1–2 ft., rather slender, usually simple. *Radical leaves* cordate. *Racemes* long, simple, secund; flowers drooping; pedicels slender, short. *Calyx-tube* obconic, 5-ribbed; lobes short, reflexed, linear or ovate. *Corolla* bright blue, lobes recurved. *Capsule* subglobose, valves basal.—DISTRIB. Europe, W. Siberia.—The lowest flower opens first.

6. **C. Trachel'ium,** *L.*; hispid, stem tall angled, leaves all petioled ovate-lanceolate from a broad base irregularly coarsely obtusely serrate, bracts leafy. *Nettle-leaved Campanula.*

Woods and copses in dry soil, from Anglesea and York to Devon and Kent; Kilkenny only in Ireland; fl. Sept.–Oct.—*Rootstock* short, stout. *Stem* 1–3 ft., hairs reversed. *Leaves* doubly-serrate; radical long-petioled cordate; cauline gradually attenuated from the base, acute. *Racemes* panicled, peduncles short; bracteoles lanceolate; flowers 1 or many, erect or inclined. *Calyx-tube* hispid, very short and broad; lobes ovate-lanceolate. *Corolla* ½–¾ in., blue-purple, broadly campanulate; lobes suberect, acute. *Capsule* drooping, valves basal.—DISTRIB. Europe, N. Africa, Siberia.—The uppermost flower in each raceme opens first.

7. **C. glomera'ta,** *L.*; pubescent, stem short terete leafy, leaves crenate, radical very long-petioled oblong- or ovate-cordate, cauline sessile ovate ½-amplexicaul, flowers erect in leafy heads or irregularly spiked.

Chalky and dry pastures, from Forfarshire to Dorset and Kent; rare or absent in the West and in Ireland; fl. Sept.–Oct.—*Rootstock* short, stout. *Stem* 6–18 in., slender. *Cauline leaves* ½–¾ in. *Flowers* bright blue, mostly in a terminal head with a few axillary buds below it, subsessile. *Calyx-tube* short, obconic, 5-ribbed; lobes ovate. *Corolla* ½–¾ in.; lobes recurved, acute. *Capsule* short, valves basal.—DISTRIB. Europe to S. Russia, W. Asia, Siberia, Dahuria.—The central flower opens first.

SUB-GEN. 2. **Wahlenber'gia,** *Schrad.* (gen.). *Corolla* campanulate. *Capsule* ½-superior, opening by loculicidal valves above the calyx-tube.

8. **C. hedera'cea,** *L.*; glabrous, very slender, creeping, leaves all petioled orbicular or cordate angled or obscurely lobed, peduncles 1-flowered leaf-opposed, corolla cylindric-campanulate, lobes short.

Bogs and damp woods, especially in the West, from Renfrew and York southwards; S. and E. of Ireland, rare; fl. July–Aug.—*Rootstock* creeping. *Stems* filiform. *Leaves* ⅛–½ in. diam., membranous, subacutely 5-angled or -lobed, upper often opposite; petiole slender, dilated upwards. *Peduncles* much longer than the petioles. *Calyx-tube* shortly turbinate; lobes triangular-subulate, erect. *Corolla* ⅛ in., pale blue; lobes obtuse, recurved. *Capsule* subglobose, membranous.—DISTRIB. Europe from Denmark and France to Germany, and from Spain to Dalmatia.

SUB-GEN. 3. **Specula'ria,** *Heist.* (gen.). *Corolla* rotate. *Capsule* fusiform, angled, opening by slits beneath the calyx-limb.

9. **C. hyb'rida,** *L.*; annual, hispid or puberulous, leaves oblong waved, flowers subsessile axillary, calyx-lobes exceeding the corolla.

Cornfields in dry soils, from York and Durham southwards; Fife and Haddington in Scotland, but introduced; a colonist, *Watson;* fl. June–Sept.—*Stem* 6–10 in., erect or decumbent, simple or branched from the base, angled. *Leaves* small; radical with broad petioles, ovate or spathulate; cauline sessile, obtuse. *Calyx-tube* longer than the floral leaves, sharply angled; lobes linear-oblong, rather foliaceous. *Corolla* blue inside, lilac outside, cleft to near the middle; lobes acute. *Capsule* 1–1½ in. *Seeds* polished, ovoid.—DISTRIB. Europe from Holland southwards, N. Africa.

3. PHYTEU'MA, *L.* RAMPION.

Perennial herbs. *Radical leaves* petioled, cauline usually narrow, sessile. *Flowers* in dense spikes or heads; involucre of several bracts. *Calyx* ovoid or obconic; limb superior 5-fid. *Corolla* curved in bud, 5-cleft, segments linear, tardily opening, sometimes at length free. *Stamens* 5, epigynous, filaments linear dilated at the base; anthers free. *Ovary* 2–3-celled; style filiform, pilose above, stigmas 2–3 short filiform. *Capsule* ovoid, dehiscing below the middle by longitudinal valves. *Seeds* many, ovoid or compressed; embryo straight, cotyledons divaricating.—DISTRIB. Europe, W. Asia; species about 35.—ETYM. Obscure.

1. **P. orbicula're,** *L.*; glabrous or slightly hairy, heads globose in flower, oblong in fruit, stigmas usually 3.

Chalk downs, from Kent to Wilts, local; fl. July–Aug.—*Rootstock* tuberous below. *Stems* 6–18 in., several, erect or ascending. *Radical leaves* 1–2 in., oblong- or ovate-lanceolate, rarely cordate, crenate, long-petioled; cauline few, smaller upwards, narrower, sessile. Heads ¾–1¼ in. diam.; bracts short, oblong, acute. *Flowers* deep blue. *Calyx-tube* short; lobes triangular. *Corolla-lobes* at length free to the base. *Capsule* short, usually 2–3-celled.—DISTRIB. Europe from Belgium southwards, S. Russia.

2. **P. spica'tum,** *L.*; glabrous, heads oblong or cylindric in flower elongate in fruit, styles very long, stigmas 2.

Woods and thickets, Waldron and Mayfield in Sussex; native? *Watson;* fl. May–June.—Taller and more robust than *P. orbiculare;* stem 2–3 ft., ribbed. *Radical leaves* cordate at the base, ovate or oblong; cauline spreading and recurved. *Heads* 1–4 in., yellowish. *Capsule* usually 2-celled.—DISTRIB. Europe to S. Russia.—Formerly cultivated and the root eaten.

4. JASI'ONE, *L.* SHEEP'S-BIT.

Annual or perennial herbs. *Radical leaves* usually rosulate; cauline narrow, alternate. *Flowers* small, in terminal centripetal heads; involucre of many bracts. *Calyx-tube* short, limb 5-fid. *Corolla* regular, 5-cleft to the base. *Stamens* 5, epigynous, filaments free; anthers connate, their tips free. *Ovary* 2-celled; style clavate, with 10 hairy ridges, stigmas 2 short. *Capsule* opening at the top by 2 gaping valves. *Seeds* minute, testa shining.—DISTRIB. Europe, N. Africa, W. Asia; species about 10.—ETYM. Doubtful.

1. **J. monta'na,** *L.*; hispidly pubescent, leaves obovate-oblong.

Heathy pastures and light soils in England, Ireland, and W. of Scotland (Moray only in the E.); ascending to 1,000 ft. in Northumberland; fl. June–Sept.—Habit of *Scabiosa*. Annual. *Stem* 6–18 in., branched from the base. *Leaves* ½–1 in., radical petioled, cauline linear-oblong, obtuse, waved or crenate, ciliate. *Peduncles* long, slender, naked. *Heads* 1–6, ½–¾ in. diam., hemispheric; bracts ovate, acute, as long as the lilac-blue flowers. *Calyx-tube* turbinate; lobes subulate. *Corolla-lobes* at first coherent, persistent. *Capsule* small, subglobose.—DISTRIB. Europe, N. Africa, W. Asia.

Order XLIV. **ERICA'CEÆ.**

Evergreen shrubs, rarely herbs or trees; (*Monotropa* is a leafless parasite.) *Leaves* alternate opposite or whorled, simple, often articulate with the stem, exstipulate. *Flowers* regular or nearly so. *Calyx* superior or inferior, 4–5-fid or -partite. *Corolla* hypogynous or epigynous, usually campanulate and 4–5-toothed or -lobed, rarely of 5 petals; lobes imbricate in bud. *Stamens* 4, 5, 8, or 10, hypogynous or epigynous; anthers 2-celled, cells obtuse or with tubular tips, opening by terminal pores or slits, often with basal or dorsal awns. *Disk* epigynous or hypogynous, annular and lobed or of glands or scales. *Ovary* 4–5-celled- angled or -lobed; style terminal or from between the lobes, stigma small simple or 4–5-lobed; ovules many in each cell, rarely few or solitary, pendulous from simple or 2-fid axile placentas. *Fruit* 3–5-celled, a berry or 3–5-valved capsule; cells many- rarely 1-seeded. *Seeds* small, testa reticulate sometimes lax and produced at both ends, albumen fleshy; embryo minute, clavate.—Distrib. Chiefly temp. and cold climates; genera about 70; species about 1,000.—Affinities. With *Epacrideæ.*—Properties unimportant.

Sub-order I. **Vaccin'ieæ.** *Buds* clothed with scales. *Stamens* epigynous. *Ovary* inferior.

Corolla campanulate or urceolate ..... 1. Vaccinium.
Corolla rotate ..... 2. Oxycoccos.

Sub-order II. **Eri'ceæ.** *Buds* naked or scaly. *Stamens* hypogynous. *Ovary* superior.

Tribe I. **ARBU'TEÆ.** *Buds* naked. *Leaves* usually broad. *Corolla* deciduous. *Fruit* a berry or drupe.

Ovary-cells many-ovuled ..... 3. Arbutus.
Ovary-cells 1-ovuled ..... 4. Arctostaphylos.

Tribe II. **ANDROMEDE'Æ.** Shrubs. *Buds* clothed with scales. *Leaves* usually broad. *Corolla* deciduous. *Capsule* loculicidal.... 5. Andromeda.

Tribe III. **ERICI'NEÆ.** *Buds* naked. *Leaves* small. *Flowers* 4-merous. *Corolla* persistent. *Anthers* usually connate in bud. *Capsule* loculicidal, rarely septicidal.

Corolla 4-fid. Capsule loculicidal, cells many-seeded ..... 6. Erica.
Corolla 4-partite. Capsule septicidal, cells few-seeded ..... 7. Calluna.

Tribe IV. **RHODORE'Æ.** *Buds* clothed with scales. *Leaves* usually broad. *Flowers* 4–5-merous. *Corolla* deciduous. *Capsule* septicidal.

Corolla urceolate. Anthers 8, with pores ..... 8. Daboecia.
Corolla urceolate. Anthers 10, with pores ..... 9. Phyllodoce.
Corolla campanulate. Anthers 5, with slits ..... 10. Loiseleuria.

Tribe V. **PYROLE'Æ.** Herbs. *Buds* scaly. *Leaves* chiefly radical. *Petals* 5, free or connate, concave. *Capsule* loculicidal. *Seeds* with a loose testa produced at both ends far beyond the nucleus.

11. Pyrola.

Sub-order III. **Monotro'peæ.** Herbs, fleshy. *Leaves* replaced by scales. *Petals* perigynous, free or connate, deciduous. *Stamens* hypogynous. *Ovary* free. *Capsule* loculicidal. *Seeds* as in *Pyroleæ*..... 12. Monotropa.

1. VACCIN'IUM, *L.*

Shrubs; buds clothed with usually persistent scales. *Leaves* alternate, often evergreen. *Flowers* solitary or racemose, white or red. *Calyx-tube* short; limb 4–5-toothed. *Corolla* epigynous, urceolate or campanulate, 4–5-fid. *Stamens* 8–10, epigynous; anther-cells with tubular tips, awned or not. *Ovary* 4–5-celled; style filiform, stigma obtuse; placentas prominent, many-ovuled. *Berry* 4–5-celled, areolate at the top. *Seeds* angled, testa reticulate.—DISTRIB. Europe, temp. and subtrop. Asia and America; species about 100.—ETYM. Obscure.

1. **V. Myrtil'lus,** *L.*; glabrous, stems erect angular, leaves deciduous ovate serrate, peduncles 1-flowered, anthers with dorsal awns. *Whortleberry, Bilberry.*

Woods, copses, and heaths, chiefly in hilly districts; ascends to 4,200 ft.; fl. April–June. *Rootstock* creeping. *Stems* many, 6–24 in., rigid. *Leaves* ½–1 in., nerves reticulate, young rosy. *Flowers* drooping; peduncles ¼ in., naked. *Calyx-tube* turbinate; lobes 5, short. *Corolla* ¼ in. diam., globose, rosy tinged with green. *Berry* ⅓ in. diam., dark blue, glaucous.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia, N.W. America.—Berries much used for preserves, &c. in northern countries.

2. **V. uligino'sum,** *L.*; glabrous, stem procumbent terete, branches ascending, leaves deciduous oblong or obovate quite entire glaucous beneath, peduncles 1-flowered, anthers with dorsal awns.

Mountain bogs and copses, from Westmoreland and Durham northwards, ascending to near 3,500 ft. in the Highlands; absent from Ireland; fl. May–June.—*Stems* 6–10 in., woody, rigid, naked below. *Leaves* ½–1 in., coriaceous, obtuse or acute, veins reticulate beneath. *Peduncles* 1–3 together, ½ in. *Flowers* drooping. *Calyx-tube* hemispheric; lobes 4–5, broad, obtuse. *Corolla* ⅛ in., pale pink, subglobose. *Berry* smaller than in *V. Myrtillus*, of the same colour.—DISTRIB. Europe (Arctic), Siberia to Kamtschatka, Persia, E. and W. N. America.

3. **V. Vitis-Idæ'a,** *L.*; procumbent, branches pubescent, leaves evergreen obovate dotted beneath, margins revolute, racemes short terminal drooping, anthers awnless. *Cowberry.*

Woods and heaths, chiefly in mountain districts, from S. Wales and Notts northward, also on Dartmoor; ascends to 3,300 ft. in the Highlands; fl. June–July.—*Stems* wiry, rigid, tortuous, branched and naked below; branches 6–18 in., trailing or ascending. *Leaves* ½–1¼ in., glossy green above (like box), bifarious, very coriaceous, margins thickened entire or obtusely serrulate, pale below; nerves not reticulate. *Flowers* crowded; pedicels 2-bracteolate. *Calyx-tube* hemispheric; lobes 4, broadly ovate, ciliolate. *Corolla* campanulate. *Berry* ¼ in. diam., globose, red.—DISTRIB. Europe (Arctic), Siberia to Kamtschatka, E. and W. N. America.—Berry acid.

2. OXYCOC'COS, *Tournef.* CRANBERRY.

Stems filiform, decumbent or erect, woody; buds clothed with persistent scales. *Leaves* small, alternate, evergreen. *Flowers* drooping, on terminal, slender, 2-bracteolate peduncles. *Calyx-tube* short; lobes 4. *Corolla* epigynous, rotate, 4-partite, segments reflexed. *Stamens* 8,

epigynous; anther-cells with tubular tips, not awned. *Ovary* and *fruit* as in *Vaccinium*.—DISTRIB. N. temp. and Arctic regions; species 2.—ETYM. ὀξύς and κόκκος, from the *acid berries*.

1. **O. palus'tris,** *Pers.*; creeping, leaves ovate-oblong, base cordate, margins strongly recurved. *Vaccinium Oxycoccus*, L.

Peat bogs, usually amongst *Sphagnum*, local; ascending to 2,700 ft. in the Highlands; common in Ireland; fl. Aug.—*Stems* puberulous. *Leaves* ⅛–½ in., scattered, spreading, shortly petioled, deep green above with a median channel, glaucous beneath with reticulate nerves. *Peduncles* 1–3, 1 in., capillary, erect, puberulous. *Flowers* ½ in. diam., red. *Calyx-limb* minute. *Corolla-lobes* linear-oblong. *Stamens* exserted, filaments puboscent purple; anthers yellow. *Berry* ¼ in. diam., globose, dark red.—DISTRIB. Europe (Arctic), excl. of Turkey, N. Asia and America.—The berries are an excellent antiscorbutic, and used as such upon long voyages.

3. ARBU'TUS, *L.*

Shrubs. *Leaves* alternate, usually evergreen. *Flowers* in terminal panicled racemes, bracteate, white or pale red. *Sepals* 5. *Corolla* hypogynous, globose or subcampanulate; lobes 5, reflexed. *Stamens* 10, on the base of the corolla, filaments short dilated below; anthers deflexed, ovoid, opening by 2 pores, awns 2 reflexed. *Disk* annular. *Ovary* 5-celled; style simple, stigma obtuse; ovules many, placentas pendulous from the upper angles of the cells. *Berry* globose, granulate; cells 5, 4–5-seeded. *Seeds* angled, testa coriaceous.—DISTRIB. N. temp. regions; species about 15.—ETYM. The old Latin name.

1. **A. Une'do,** *L.*; leaves obovate- or oblong-lanceolate acute doubly-serrate, panicles drooping many-flowered. *Strawberry-tree.*

Woods at Killarney, Muckross, and Bantry, probably indigenous; fl. Sept.–Oct.—A small rounded much-branched evergreen tree, 8–10 ft.; bark rough; branchlets and petioles hairy and glandular. *Leaves* 2–3 in., petioled. *Panicles* glabrous, lax; pedicels short; bracts deciduous. *Sepals* short, rounded. *Corolla* ½ in., creamy. *Berry* ¾ in. diam., orange-scarlet, subglobose, muricate.—DISTRIB. S. of France, Spain, Mediterranean region.—Berries eatable when perfectly ripe; made into a wine in Corsica.

4. ARCTOSTAPH'YLOS, *Adanson.* BEARBERRY.

Characters of *Arbutus*, but cells of ovary 5–10, 1-ovuled; disk of 3 fleshy scales; and fruit a drupe with 5–10 stones.—DISTRIB. of *Arbutus*, but more abundant in America; species about 12.—ETYM. ἄρκτος and σταφυλή, the *fruit* being a food of *bears*.

1. **A. alpi'na,** *Sprengel*; branches depressed, leaves deciduous obovate or spathulate crenate-serrate above the middle, nerves netted, drupe black.

Dry barren Scotch Mts., rare, from Perth and Forfar northwards; ascending to 2,700 ft.; fl. May–July.—Forms depressed woody glabrous patches, with stout leafy interlaced branches; bark scaly. *Leaves* ½–1½ in., narrowed to a short petiole, wrinkled above, ciliate. *Flowers* 2–3, appearing with the young leaves, shortly pedicelled; bracts ciliate. *Calyx* minute. *Corolla* ¼ in. broad, white; lobes 4–5, pubescent within. *Filaments* subulate; anthers brown, awns very short. *Berry* ¼ in. diam.—DISTRIB. Scandinavia (Arctic), Mts. of Mid. Europe, cold and Arctic Asia and America.

2. **A. Uva-Ur'si,** *Spreng.*; branches trailing, leaves evergreen obovate or spathulate quite entire very coriaceous, drupe red.

Heathy rocky places from York and Cumberland northwards; ascending to near 3,000 ft. in the Highlands; N.W. of Ireland; fl. May–June.—Forms depressed trailing masses; branches 1–2 ft., stout, woody, young puberulous; bark dark, scaling. *Leaves* ½–1 in., petiole and margin finely woolly, deep green, nerves reticulate on both surfaces. *Racemes* crowded, very short, few-flowered; scales and bracteoles persistent, ciliate; pedicels very short. *Sepals* short, broad. *Corolla* ⅓ in., pink, urceolate; teeth 4–5, hairy within. *Anthers* with long awns. *Berry* ¼ in. diam.—DISTRIB. Arctic and Alpine Europe, excl. Greece and Turkey, Siberia, E. and W. N. America.

5. ANDROM'EDA, *L.*

A small shrub; buds clothed with scales. *Leaves* alternate, glaucous beneath, margins revolute. *Flowers* in subterminal umbels, white or pink. *Sepals* 4. *Corolla* hypogynous, globose; limb 5-fid, reflexed. *Stamens* 10, hypogynous, included; filaments bearded; anthers obtuse, with 2 dorsal awns. *Ovary* 5-celled; style simple, stigma obtuse or dilated; placentas many-ovuled, pendulous. *Capsule* subglobose, loculicidally 5-valved. *Seeds* attached to a central column, small, testa hard, smooth, raphe much thickened.—DISTRIB. Arctic and Alpine Europe, excl. Greece and Turkey, Siberia, N. America.—ETYM. Mythical.

1. **A. polifo'lia,** *L.*; leaves elliptic-lanceolate glabrous shining.

Peat bogs from Perthshire southwards to Norfolk and Somerset; local in Ireland; fl. May–Aug.—*Stems* long, ascending, rooting at the base; branches 6–12 in., suberect, twiggy; bark smooth, brown. *Leaves* shortly petioled, ½–1½ in., acute, thickly coriaceous, margins strongly recurved. *Racemes* short. *Flowers* drooping; pedicels ½–1 in., slender, red. *Sepals* small, obtuse. *Corolla* ¼ in., purplish; lobes 5, revolute. *Filaments* bearded; anthers short. *Capsule* erect, 5-lobed. *Seeds* turned in all directions, ovoid.—DISTRIB. N. Arctic and Alpine Europe, excl. Greece and Turkey, E. and W. N. America.

6. ERI'CA, *L.* HEATH.

Rigid, much-branched shrubs. *Leaves* whorled, rarely alternate or scattered, narrow, rigid. *Flowers* usually nodding; pedicels 2–3-bracteate. *Sepals* 4. *Corolla* hypogynous, ovoid globose campanulate or tubular, 4-lobed, persistent. *Stamens* 8, inserted on the glandular disk; anther-cells awned, opening by pores or slits. *Ovary* 4-celled; style filiform, stigma capitate dilated 4-lobed; ovules many. *Capsule* 4-celled, loculicidally 4-valved, many-seeded. *Seeds* attached to a central axis, ovoid or compressed, testa smooth or reticulate.—DISTRIB. Europe, N. Asia, N. Africa, abundant in S. Africa; species about 400.—ETYM. Classical.

1. **E. Tet'ralix,** *L.*; pubescent and sometimes glandular, leaves 4 in a whorl, flowers subumbellate, corolla regular ovoid, anthers included with subulate awns. *Cross-leaved Heath.*

Heaths, abundant; ascending to near 2,400 ft. in the Highlands; fl. July–Sept. —Pubescence sometimes almost woolly; glandular hairs stiff or slender or 0. *Stems* 12–18 in., wiry; branches slender. *Leaves* ⅛–¼ in., in close or distant

whorls, spreading, linear, obtuse, rarely glabrous; margins revolute to the midrib. *Flowers* drooping; pedicels short, bracteolate in the middle. *Sepals* oblong-lanceolate. *Corolla* ⅛ in., mouth scarcely oblique, rose-red, upper side darkest. *Ovary* rarely glabrous, usually woolly and with gland-tipped cilia.—DISTRIB. N. and W. Europe, eastwards to Russia and Transylvania.

Sub-sp. TET'RALIX proper; pubescent, branches irregular, leaves linear-oblong.

Sub-sp. MACKAY'I, *Hook.* (sp.); puberulous or almost glabrous, hairs not gland-tipped, branches subcorymbose, leaves ovate-oblong strongly ciliate glabrous above and on the midrib, margins less recurved, sepals and capsule glabrous. *E. Mackaiana*, Bab.—Heaths between Roundstone and Clifden, Galway. (A hybrid, Moore and More, *Cyb. Hib.*; also found in Spain.)

2. **E. cine'rea,** *L.*; glabrous, leaves 3 in a whorl, flowers in whorled racemes, corolla ovoid mouth regular, anthers included with toothed appendages at the base.

Heaths and commons; ascending to 2,200 ft. in the Highlands; fl. July–Sept.—*Stems* 1–2 ft., much-branched; branches slender, ultimate pubescent. *Leaves* ⅛–¼ in., irregularly whorled, with short leafy branches in the axils, linear, acute, margins revolute to the midrib. *Flowers* drooping or horizontal; pedicels short, puberulous; bracteoles under the calyx. *Sepals* ovate-lanceolate. *Corolla* ¼–⅓ in., crimson-purple. *Ovary* glabrous.—DISTRIB. W. Europe from Norway to Spain, eastwards to Germany and N. Italy.

3. **E. cilia'ris,** *L.*; ciliate and glandular, leaves 3–4 in a whorl, flowers in unilateral racemes, corolla ovoid, anthers included awnless.

Sandy heaths, Cornwall, Dorset, and Galway; fl. June–Sept.—*Stem* 12–18 in., slender; branches many, erect, pubescent, flowering elongate. *Leaves* ⅛ in., close set, subsessile, ovate, pubescent above, beneath glaucous with minute scales, margins recurved. *Flowers* inclined; pedicels very short, bracteolate in the middle. *Sepals* ovate, pubescent and ciliate. *Corolla* ⅛–¼ in., curved, crimson, mouth small oblique. *Style* exserted. *Ovary* glabrous.—DISTRIB. Normandy, Spain.—A hybrid between *E. ciliaris* and *Tetralix* (*E. ciliaris*, var. *Watsoni*, Benth.) grows near Truro.

4. **E. va'gans,** *L.*; glabrous, leaves 3–4 in a whorl, flowers long-pedicelled in dense axillary racemes, corolla campanulate, anthers exserted 2-partite awnless. *Cornish Heath.*

Heaths in Cornwall; fl. July–Aug.—*Stem* 1–3 ft., stout, woody; branches stiff, erect, fascicled, densely leafy. *Leaves* ⅓ in., linear, recurved, margins so reflexed as to cover the midrib. *Flowers* erect; pedicels slender, bracteolate about the middle. *Sepals* ovate, ciliolate. *Corolla* ⅓ in., pink; lobes short. *Ovary* glabrous.—DISTRIB. W. of France, Spain.

5. **E. mediterra'nea,** *L.*; stem erect, leaves 4 rarely 3 in a whorl, flowers in dense racemes, corolla subcampanulate, anthers ½-exserted awnless. *E. mediterranea*, var. *hibernica*, Hook.; *E. hibernica*, Syme.

Boggy heaths, Mayo and Galway; fl. April–May.—Bushy, 2–5 ft., glabrous. *Leaves* ¼–⅓ in., crowded, shortly petioled, linear, margins revolute to the midrib and connate to the under-surface. *Racemes* terminal and axillary; pedicels solitary or in pairs, short, 2-bracteolate in the middle. *Sepals* ovate-lanceolate. *Corolla* pink, cylindric-campanulate, lobes broad. *Anthers* 2-fid at the tip.—DISTRIB. W. of France, Spain, Mediterranean shores.

7. CALLU'NA, *Salisbury.* LING.

A small, much-branched, gregarious shrub. *Leaves* minute, opposite, imbricate (whence the branches appear tetragonal). *Flowers* on axillary peduncles with 2 pairs of opposite bracts under the calyx. *Sepals* 4, scarious, coloured. *Corolla* shorter than the sepals, hypogynous, 4-partite. *Stamens* 8, inserted on the disk; anthers awned, cells opening by short lateral slits. *Ovary* 4-celled; style exserted, stigma dilated obscurely 4-lobed; ovules 2, pendulous from the top of each cell. *Capsule* 4-celled, septicidally 4-valved, septa attached to the axis. *Seeds* 1–2 in each cell, attached to the central column.—DISTRIB. Europe (Arctic), W. Siberia, Azores, Greenland, Newfoundland, and N. U. States (very rare).—ETYM. καλλύνω, the twigs being used for *sweeping*.

1. **C. vulga'ris,** *Salisb.*; leaves 3-gonous, gibbous at the base. *Erica*, L. Heaths and moors, ascending to 3,300 ft. in the Highlands; fl. July–Sept.—*Stem* 1–2 ft., woody, inclined; branches elongate. *Leaves* ⅛ in., linear-oblong, glabrous (vars. *glabrata* and *atlantica*, Teem. sp.) or ciliate or pubescent or hoary (var. *incana*). *Flowers* very many; pedicels very short; outer bracts leaf-like, inner scarious. *Sepals* ⅛ in., concave, obtuse, rose-purple or white, shining. *Corolla* much shorter, lobes triangular. *Anthers* short, dorsally fixed, 2-fid. *Style* exserted. *Ovary* pubescent.

8. DABEO'CIA, *Don.* ST. DABEOC'S HEATH.

A small shrub; buds scaly. *Leaves* alternate, evergreen. *Flowers* terminal, racemose. *Sepals* 4. *Corolla* hypogynous, urceolate; lobes 4, reflexed. *Stamens* 8, hypogynous, included; anthers obtuse, cells opening by pores, awnless. *Ovary* 4-celled; style simple, stigma dilated; ovules many. *Capsule* 4-celled, septicidally 4-valved, axis persistent. *Seeds* small, testa smooth or pitted.—DISTRIB. Ireland, W. France, Spain.—ETYM. St. Dabeoc.

1. **D. polifo'lia,** *Don;* leaves elliptic-ovate obtuse ciliate.

Boggy heaths, Connemara and Mayo; fl. Aug.—*Stem* 1–2 ft., woody, decumbent; bark flaking; branches slender, erect, pilose and glandular. *Leaves* ½–¾ in., shortly petioled, margins recurved, bright green, glossy above, white and woolly below. *Raceme* terminal, lax, 5–10-flowered, glandular; flowers drooping; pedicels stout, curved; bracts leafy. *Sepals* ovate-lanceolate, ciliate. *Corolla* ¼ in., crimson purple or white, lobes short. *Filaments* flat; anthers sagittate, 2-fid, purple. *Ovary* villous and glandular; stigma truncate.

9. PHYLLODO'CE, *Salisbury.*

Small shrubs; buds scaly. *Leaves* evergreen, scattered. *Flowers* solitary or umbelled. *Sepals* 5. *Corolla* urceolate or campanulate, 5-fid. *Stamens* 10, hypogynous, filaments slender; anthers truncate, opening by pores, awnless. *Ovary* 5-celled; style slender, stigma capitate. *Capsule* 5-celled, septicidally 5-valved, many-seeded. *Seeds* shining.—DISTRIB. Arctic regions; species 3 or 4.—ETYM. Mythological.

1. **P. cæru'lea,** *Bab.*; leaves shortly petioled crowded spreading linear obtuse glabrous. *P. taxifolia*, Salisb.; *Menziesia*, Swartz.

Heathy moors, Sow of Atholl, alt. 2,700 ft., extremely rare; fl. May.—Short, depressed, much branched, woody; branches 5–10 in., tubercled. *Leaves*

¼–⅓ in., rigidly coriaceous, glossy and channelled above, margins reflexed to the puberulous midrib beneath. *Flowers* few, drooping, in terminal umbellate corymbs; pedicels ½–1½ in. *Sepals* ovate-lanceolate, glandular-pubescent. *Corolla* ⅓ in., lilac, urceolate. *Anthers* purple. *Ovary* glandular-pubescent.—DISTRIB. Scandinavia (Arctic), Mts. of W. France, Pyrenees, Siberia to Kamtschatka, E. and W. N. America.

10. LOISELEU'RIA, *Desvaux.*

A small glabrous depressed, branching, rigid, evergreen shrub; buds scaly. *Leaves* small, opposite, quite entire, margins revolute. *Flowers* on terminal 1-flowered peduncles, pink, small. *Sepals* 5. *Corolla* hypogynous, broadly campanulate, 5-fid. *Stamens* 5, hypogynous, slightly adnate to the corolla; anthers short, included, slits lateral. *Ovary* subglobose, 2–3-celled; style short, straight, stigma capitate; ovules many. *Capsule* 2–3-celled, septicidally 2–3-valved, valves 2-fid. *Seeds* several, ovoid, testa thick pitted.—DISTRIB. Arctic and Alpine (excl. Pyrenees) Europe, cold and Arctic Asia and America.—ETYM. *Loiseleur-Deslongchamps*, a French botanist.

1. **L. procum'bens,** *Desv.*; leaves rigidly coriaceous recurved linear-oblong obtuse. *Azalea*, L.

Moorlands on the high Scotch Alps, alt. 1,500–3,600 ft., from Ben Lomond northwards; fl. May–June.—Forms flat patches with interlaced rigid woody branches. *Leaves* ⅛–¼ in., crowded, petioled, deep green, glossy, deeply channelled above, beneath densely pubescent, midrib very stout. *Flowers* usually 2–3, inclined, subcorymbose; peduncle red, ⅛–¼ in., stout, ebracteolate. *Sepals* ovate-lanceolate, red. *Corolla* ⅛ in. diam., pink; lobes obtuse. *Stamens* included. *Capsule* minute, valves 2-fid.

11. PY'ROLA, *Tournef.* WINTER-GREEN.

Biennial or perennial herbs; rootstocks slender, creeping; stems short, almost woody; buds scaly. *Leaves* chiefly radical, alternate, broad, petioled, evergreen. *Flowers* secund, racemose, rarely solitary, white pink or yellowish, nodding; scapes bracteate; pedicels bracteolate at the base. *Sepals* 5. *Corolla* globose, rarely spreading, of 5 free or slightly connate orbicular petals, subpersistent. *Stamens* 10, in pairs opposite the petals, hypogynous, erect or declinate, filaments subulate, tip incurved; anther-cells opening by terminal pores. *Ovary* 5-celled; style erect or declinate, stigma capitate 5-lobed or -cleft; ovules many. *Capsule* globose, 5-angled, 5-celled, loculicidally 5-valved; valves septiferous, usually with tomentose edges; central column bearing the seeds on fungous placentas. *Seeds* very minute, elongate, testa produced loose, nucleus minute.—DISTRIB. N. temp. zone; species about 12.—ETYM. *Pyrus*, from a similarity in the foliage to that of the *pear*.

SUB-GEN. 1. **Py'rola** proper. *Flowers* racemose. *Petals* 5, free, incurved. *Anther-cells* short, obtuse. *Stigmatic lobes* short. *Valves of capsule* cohering by fibres.

1. **P. mi'nor,** *Sw.*; leaves orbicular-ovate obscurely crenate, stamens erect as long as the short straight style, stigma-rays large.

Woods, heaths and commons, from Ross and Moray to Kent and Devon; rare in the S. of England; ascends to 1,500 ft. in the Highlands; Mid. and N.E. Ireland, rare and local; fl. June–Aug.—*Stem* 1–3 in., ascending. *Leaves* usually in a rosette, but sometimes alternate, coriaceous, 1–1½ in., contracted into the longer petiole. *Scape* 8–12 in., slender. *Raceme* short, bracteoles subulate-lanceolate. *Flowers* ¼ in. diam., drooping, globose, white tinged with rose. *Stamens* very short. *Style* without a ring below the stigma, not lengthening in fruit. *Capsule* drooping.—DISTRIB. Europe (Arctic), excl. Turkey, E. and W. N. America.

2. **P. me'dia,** *L.*; leaves orbicular-ovate crenate, stamens erect shorter than the straight or slightly decurved style, stigma-lobes minute erect.

Woods and heaths, local, from Sussex and Worcester northwards; ascending to 1,800 ft. in the Highlands; N. and W. of Ireland; fl. July–Aug.—Very like *P. minor*, but larger and stouter; leaves broader, sometimes orbicular and 1¾ in. diam., and bracts larger. *Flowers* ½ in. diam. *Style* with a ring round the base of the stigma.—DISTRIB. Europe, excl. Greece and Turkey.

3. **P. rotundifo'lia,** *L.*; leaves orbicular-obovate, stamens ascending shorter than the long decurved style, stigma-lobes minute erect.

Moist woods and copses, rare, from Forfar and Aberdeen to Shropshire and Kent; ascends to 2,500 ft. in Scotland; absent from Ireland; fl. July–Sept.—Habit and stature of *P. minor*, but petioles all longer and very slender; raceme usually longer; bracts larger, spreading; flowers ½ in. diam., pure white; style with a ring below the stigma.—DISTRIB. Europe (Arctic), except Greece and Turkey, N. Asia, Himalaya, N. America.

VAR. 1, *rotundifo'lia* proper; braets on the scape few, pedicels a little longer than the lanceolate sepals.—VAR. 2, *arena'ria*, Koch; leaves smaller, bracts many on the scape, pedicels as long as the ovate sepals. *P. maritima*, Kenyon. Sea-shore, Lancashire.

4. **P. secun'da,** *L.*; leaves ovate acute serrate, raceme secund, stamens incurved shorter than the long ascending style, stigma broad lobed.

Rocky mountain woods, rare; Teesdale, Keswick, Dumfries, and from Perth and Argyle northwards, ascending to 2,400 ft.; N.E. of Ireland, very rare; fl. July.—*Stem* straggling, branched; branches 1–4 in., ascending. *Leaves* 1–1½ in., rosulate or alternate, rather thin, reticulate, petioles shorter. *Scape* slender, 2–5 in., with 1–5 bracts. *Racemes* 1–2 in., bracteoles linear-oblong. *Flowers* horizontal, ½ in. diam. *Sepals* obtuse, erose. *Petals* concave, greenish-white. *Style* without a ring below the stigma, elongate in fruit. *Capsule* drooping.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia, N. America.

SUB-GEN. 2. **Mone'ses,** *Salisb.* (gen.). *Flower* solitary. *Petals* slightly adherent at the base, spreading. *Anther-cells* with tubular tips. *Stigmatic lobes* long. *Valves* of capsule free.

5. **P. uniflo'ra,** *L.*; scape 1-bracteate at the top, leaves orbicular spathulate sinuate serrate. *Moneses grandiflora*, Salisb.

Woods, chiefly of fir, in the N. Highlands, from the Hebrides, Perth, and Aberdeen northwards.—*Stem* ½–2 in., short, leafy. *Leaves* ½–1 in., alternate, narrowed into a short petiole, rather membranous. *Flowers* ¾ in. diam., nodding, then erect. *Sepals* broad, obtuse, ciliate. *Petals* almost flat, white, spreading. *Filaments* curved. *Style* not terminated by a ring. *Capsule*

erect, crowned with the style and persistent elongate stigmas.—DISTRIB. Europe (Arctic), except Greece and Turkey, Siberia, N. America.

12. MONOT'ROPA, *L.* BIRD'S-NEST.

Simple, brown or pale, erect herbs; rootstock scaly. *Leaves* reduced to scales, alternate. *Flowers* campanulate, in terminal racemes, rarely solitary, uppermost 5–6-merous, the rest 4-merous. *Sepals* and *petals* erect, coloured, membranous, saccate at the base. *Stamens* 8–10, hypogynous, filaments subulate; anthers reniform, 1-celled, dehiscing across the top, valves very unequal. *Ovary* 4–5-celled, 8–10-furrowed; style columnar, stigma discoid; ovules innumerable, on fleshy placentas filling the cavity. *Capsule* loculicidally 5-valved. *Seeds* very many, minute, testa loose reticulate produced at both ends.—DISTRIB. N. temp. regions; species 3 or 4.—ETYM. *μόνος, one,* and *τρόπος,* from the curved raceme.

1. **M. Hypop'itys,** *L.*; flowers racemose, sepals and petals erose obtuse.

Woods near roots of fir and beech, from Aberdeen and Moray southwards; local in Scotland; Mid. Ireland, very rare; fl. July–Aug.—Probably a parasite, from its colour and habit. *Stem* 6–12 in., stout, fleshy, cream-white. *Scales* oblong. *Raceme* drooping till after fertilization, then erect. *Flowers* ½ in., many, drooping; pedicels short, erect in fruit; bracts scale-like. *Sepals* irregularly disposed. *Filaments* incurved, the alternate longer; anthers reaching the stigma. *Style* short. *Fruit* ovoid or globose.—DISTRIB. Europe (Arctic), excl. Greece and Turkey, Siberia, Dahuria, N. America.

VAR. *glabra,* Bernh.; all glabrous.—VAR. *hirsuta,* Roth.; bracts ciliate, inner surface of sepals petals stamens and ovary pubescent.

ORDER XLV. OLEI'NEÆ.

Shrubs or trees; branches opposite; buds terminal, scaly. *Leaves* opposite, simple, or pinnate with a terminal leaflet, exstipulate. *Flowers* in terminal or axillary 3-chotomous cymes, small, white or greenish, 1–2-sexual; pedicels opposite, 2-bracteolate. *Calyx* inferior, 4-lobed or 0. *Corolla* hypogynous, regular, 4-partite, deciduous, rarely 0, or of 4 free petals, valvate in bud. *Stamens* 2, anthers dorsally inserted, dehiscence inwards. *Disk* 0. *Ovary* 2-celled; style simple or 0, stigma entire or 2-fid; ovules 2 collateral in each cell rarely 3, pendulous from the septum, anatropous, raphe dorsal. *Fruit* 1–2-celled, cells 1- rarely 2-seeded. *Seed* pendulous, testa sometimes winged, albumen fleshy or horny; embryo straight, cotyledons flat thin. —DISTRIB. Trop. and temp. regions, chiefly northern; genera 24; species 150.—EXCEPTIONS. (British) Petals 0 in *Fraxinus,* which has 3-ovulate cells.—AFFINITIES. With *Jasmineæ.*—PROPERTIES. *Olea europæa* yields oil in its fleshy sarcocarp, a bitter bark, and hard durable wood. *O. fragrans* and others yield the odoriferous flowers used to scent China tea. Manna is the produce of several Ashes. Various barks are febrifuges, and that of Ash is cathartic.

Corolla funnel-shaped, 4-lobed. Fruit a berry.....1. Ligustrum.
Corolla 0 (in the Brit. sp.). Fruit a samara.....2. Fraxinus.

1. LIGUS'TRUM, *Tournef.* PRIVET.

Shrubs, rarely small trees. *Leaves* often evergreen, quite entire. *Flowers* in terminal thyrsoid cymes. *Calyx* shortly tubular, 4-toothed, deciduous. *Corolla* funnel-shaped, 4-lobed. *Stamens* 2, included in the corolla-tube. *Ovary* ovoid; style very short, stigma 2-fid lobes obtuse; ovules 2 in each cell. *Berry* globose, 2-celled, cells 1–2-seeded, flesh oily. *Seeds* ovoid or angled, albumen hard, cotyledons ovate-lanceolate.—DISTRIB. Europe, N. Asia, especially Japan; species about 10.—ETYM. *ligare, to bind,* from a use of the twigs.

1. **L. vulga're,** *L.*; shrubby, leaves oblong-lanceolate quite entire.

Thickets in England, from York and Durham southwards; naturalized in Scotland; apparently wild in S. of Ireland, fl. June–July.—A glabrous bush, 4–10 ft., almost evergreen; branches slender, bark smooth. *Leaves* 1–2 in., shortly petioled, acute. *Panicles* 1–3 in. *Corolla* ⅛–¼ in. *Berry* ⅓ in. diam., globose, purple-black.—DISTRIB. Europe, N. Africa.—Berries yield a rose-dye and a bland oil used for cooking in Germany.

2. FRAX'INUS, *Tournef.* ASH.

Deciduous trees. *Leaves* simple or pinnate, leaflets opposite with an odd one, toothed or serrate. *Flowers* polygamous or dicœcious. *Calyx* 4-fid or 0. *Petals* 0, or 4 connate at the base. *Stamens* 2, hypogynous. *Ovary* oblong; stigma subsessile 2-fid; ovules 2–3 in each cell. *Fruit* a compressed 1–2-celled samara, winged at the tip, cells 1-seeded. *Seed* compressed, albumen fleshy; embryo straight, cotyledons broad.—DISTRIB. Europe, N. Asia, N. America; species about 30.—ETYM. Doubtful.

1. **F. excel'sior,** *L.*; leaflets oblong-lanceolate serrate, perianth 0.

Woods and hedges, but generally planted, ascending to 1,350 ft. in Yorkshire; fl. April–May.—*Tree* 50–80 ft.; bark smooth; branchlets stout; buds large, black. *Leaflets* 1–3 in., 4–7-pair. *Flowers* small, polygamous, in dense small axillary panicles. *Stamens* purple-black. *Samaras* 1½ in., in large drooping panicles, pedicelled, linear-oblong, notched at the tip; nucleus oblong, ribbed. *Seed* ½ in.—DISTRIB. Europe (excl. Greece), N. Africa. —Wood excellent. A 1-foliolate state occurs, *F. heterophylla,* Vahl.

ORDER XLVI. APOCY'NEÆ.

Trees or shrubs, rarely herbs, often climbing; juice milky. *Leaves* opposite, rarely whorled, quite entire; stipules 0 or rudimentary. *Flowers* regular, axillary or terminal, solitary or cymose. *Calyx* 4–5-fid. *Corolla* hypogynous, funnel- or salver-shaped; throat naked or with scales; lobes usually oblique, contorted in bud. *Stamens* 4–5, on the tube or throat of the corolla, filaments very short often dilated above; anthers basifixed, dehiscence introrse, usually elongate, free or connate and adhering to the stigma; cells sometimes obliterated below; pollen granular. *Disk* 0 or annular. *Ovary* of 2 free or connate carpels; style short, dilated, stigma entire or 2-fid often constricted in the middle; ovules many, anatropous or amphitropous, placentas marginal. *Fruit* usually of 2 many-seeded

follicles, sometimes a berry or drupe. *Seeds* compressed, sometimes winged, hilum basilar or lateral, with often a pencil of silky hairs at the hilar (rarely at the other) end, albumen fleshy or hard or 0; embryo straight, cotyledons flat thin, radicle variable in direction.—DISTRIB. Chiefly trop.; genera 100; species 500–600.—AFFINITIES. With *Asclepiadeæ*, and *Rubiaceæ*.—PROPERTIES. Usually poisonous drastic purgatives, or febrifuges.

VIN'CA, *L.* PERIWINKLE.

Perennial herbs or slender decumbent undershrubs. *Leaves* evergreen. *Flowers* solitary, white blue or purple. *Calyx* 5-partite, lobes acuminate, glandular at the base inside. *Corolla* salver-shaped; tube hairy inside; throat thickened angled; lobes 5, oblique. *Stamens* 5, filaments short; anthers inflexed, tipped with a bearded membrane, pollen glutinous. *Disk* of 2 glands alternating with the carpels. *Ovary* of 2 carpels; style thickened above, terminated by a cup-shaped reflexed membrane, within which is the short conical entire or 2-lobed stigma. *Follicles* 2, slender, terete, many-seeded. *Seeds* subcylindric, testa black tuberculate, hilum lateral, albumen fleshy; embryo axile.—DISTRIB. Europe, Asia, Africa; species about 10.—ETYM. *vincere*, from a use of the stems in *binding*.

V. MI'NOR, *L.*; flowerless-stems prostrate rooting, leaves elliptic-ovate margins glabrous, calyx-lobes glabrous ⅓ the length of the corolla-tube.

Woods, copses, and hedgebanks, from Stafford southwards, but often only naturalized; a denizen, *Watson;* not indigenous in Scotland or Ireland; fl. April–May.—*Stems* 1–2 ft., trailing, tough, flowering ones short, erect. *Leaves* 1–1½ in., very shortly petioled. *Flowers* 1 in. diam.; peduncles not as long. *Corolla* blue-purple. *Fruit* rarely found.—DISTRIB. Europe from Denmark southwards (excl. Greece), W. Asia.

V. MA'JOR, *L.*; flowerless-stems prostrate not rooting, leaves ovate or cordate at the base ciliate, calyx-lobes ciliate equalling the corolla-tube.

Copses and hedges, naturalized; an alien, *Watson;* fl. April–May.—Much larger in all its parts than *V. minor;* flowerless-stems not tough, rooting at the tip only; flowering erect in flower, elongating afterwards.—DISTRIB. Mid. and S. Europe, N. Africa.

ORDER XLVII. GENTIA'NEÆ.

Herbs, usually glabrous, erect, 3-chotomously branched; juice bitter. *Leaves* opposite, quite entire, rarely whorled (alternate and 3-foliolate in *Menyanthes*, alternate and floating in *Limnanthemum*); exstipulate. *Flowers* regular, solitary, or in 2–3-chotomous cymes. *Calyx* inferior, 4–8-toothed or lobed; lobes twisted or valvate in bud. *Corolla* hypogynous, often persistent, rotate campanulate or funnel-shaped; throat naked fimbriate or scaly; lobes 4–8, usually contorted in bud. *Stamens* 4–8, inserted on the corolla-tube, filaments filiform; anthers introrse, turning over and becoming extrorse during flowering, sometimes twisted. *Ovary* 1- or almost 2-celled; style continuous with the ovary or 0; stigma 2-fid or 2-lamellar; ovules many, 1–2-seriate on 2 opposite placentas,

horizontal, anatropous. *Capsule* 1- or incompletely 2-celled, septicidally 2-valved, rarely indehiscent, many-seeded. *Seeds* minute, testa reticulate, albumen copious fleshy; embryo minute, cotyledons small, cohering or diverging.—DISTRIB. Chiefly in cold and temp. mountain regions, rarely polar; genera 60; species 450.—AFFINITIES. Close with *Apocyneæ*.—PROPERTIES. Bitter and tonic.

SUB-ORDER I. **Gentia'neæ.** *Leaves* opposite. *Corolla-lobes* twisted.
Corolla rotate. Stamens 6–8. Leaves perfoliate.....1. Chlora.
Corolla funnel-shaped. Stamens 4. Stigma entire.....2. Cicendia.
Corolla funnel-shaped. Stamens 5. Anthers twisted.....3. Erythræa.
Corolla-tube subclavate. Anthers straight. Stigmas 2.....4. Gentiana.

SUB-ORDER II. **Menyan'theæ.** *Leaves* alternate. *Corolla* induplicate.
Leaves 3-foliolate.....5. Menyanthes.
Leaves orbicular, floating.....6. Limnanthemum.

1. CHLO'RA, *L.* YELLOW-WORT, YELLOW CENTAURY.

Annual or biennial, erect, glaucous herbs. *Leaves* broadly connate at the base. *Flowers* yellow, in 3-chotomous cymes. *Calyx* 6–8-partite. *Corolla* rotate, persistent, 6–8-partite. *Stamens* 6–8, inserted on the throat of the corolla. *Ovary* 1-celled; style 2-fid, deciduous, stigmas oblong obtuse. *Capsule* septicidally 2-valved, many-seeded. *Seeds* minute, sunk in the placentas.—DISTRIB. Europe, N. Africa, W. Asia; species 2.—ETYM. χλωρός, *yellow.*

1. **C. perfolia'ta,** *L.*; radical leaves obovate-spathulate, cauline ovate.
Chalk or clay banks and pastures from York southwards; S. and Mid. Ireland; fl. June–Sept.—Glabrous. *Stems* 1 or more from the root, 6–18 in., terete. *Radical leaves* 1–2 in., rosulate, obtuse; cauline smaller, broadly ovate, acute. *Flowers* ½–⅔ in. diam., many. *Sepals* slender, lanceolate-subulate. *Corolla-lobes* bright yellow, oblong, obtuse; tube finally ruptured by the capsule. *Stigma* 2-fid.—DISTRIB. Europe (excl. Greece) from Belgium southwards, N. Africa, W. Asia.

2. CICEN'DIA, *Adanson.*

Small annual branched herbs. *Leaves* oblong or filiform. *Flowers* small, yellow or pink, in 3-chotomous cymes or fascicles. *Calyx* 4–5-lobed or -partite. *Corolla* funnel-shaped, persistent; tube short or 0, throat naked; lobes 4–5. *Stamens* 4–5, inserted on the corolla-tube. *Ovary* 1- or partially 2-celled; style deciduous, stigma capitellate; ovules many, on 2 parietal placentas. *Capsule* 1- or almost 2-celled, 2-valved, many-seeded. *Seeds* minute, immersed in the placenta.—DISTRIB. Europe, N. America; species 3 or 4.—ETYM. Doubtful.

1. **C. filifor'mis,** *Reich.*; leaves subulate, calyx campanulate, teeth deltoid acute, corolla-lobes obtuse equalling the tube. *Exacum,* Sm.
Sandy bays, Pembroke and Cornwall to Sussex; Cork in Ireland; fl. July–Oct.—Glabrous. *Stem* 4–8 in., angled, simple or sparingly branched above, very slender, branches suberect. *Leaves* ⅛–¼ in. *Flowers* 4-merous, yellow; pedicels stout, very long, ½–2½ in. *Capsule* ovoid, ⅛ in.—DISTRIB. Europe from Denmark southwards (excl. Russia), Azores.

2. **C. pusilla,** *Griseb.*; branches spreading, leaves linear, calyx-tube 0, lobes subulate, corolla-lobes mucronate ½ as long as the tube.

Sandy commons at Paradis in Guernsey; fl. July–Sept.—Smaller and more slender than *C. filiformis*. *Stems* several, spreading; branches divaricate. *Leaves* ¼ in. *Flowers* sometimes 5-merous, pink; peduncles slender. *Calyx-lobes* erect. *Capsule* fusiform.—DISTRIB. Belgium and France.

3. ERYTHRÆA, *Pers.* CENTAURY.

Annual herbs. *Stems* erect, angular. *Leaves* connate. *Flowers* small, pink white or yellow, in terminal 3-chotomous cymes. *Calyx* 4–5-partite. *Corolla* funnel-shaped, persistent; tube cylindric, throat naked; lobes 4–5. *Stamens* 4–5, on the corolla-tube; anthers spirally twisted, exserted. *Ovary* almost 2-celled; style deciduous, stigmas 2; ovules many. *Capsule* linear, 1- or almost 2-celled, 2-valved, many-seeded. *Seeds* minute.—DISTRIB. Temp. Europe, N. Africa, N. Asia, rare in N. America; species about 15. —ETYM. *ἐρυθρός*, from the *red* flowers.

1. **E. Centaurium,** *Pers.*; radical leaves ovate or oblong-spathulate.

Dry pastures and sandy coasts; fl. June–Sept.—Erect, glabrous, 6–18 in., usually branched above. *Radical leaves* ¼–2 in., upper sometimes linear. *Flowers* ⅛–½ in. diam., many, red or pink. *Calyx-lobes* linear-subulate. *Corolla-lobes* oblong, obtuse or subacute. *Capsule* slender.—DISTRIB. Europe from Gothland southwards, N. Africa; introd. in N. America.

Sub-sp. CENTAURIUM proper; leaves 3–7-nerved, cymes fascicled, lateral flowers pedicelled, calyx-lobes about ½ as long as the corolla-tube, corolla ½ in. diam., capsule exceeding the calyx. *E. latifolia*, Engl. Bot.; (a stunted var.). *Chironia Centaurium*, Sm.—VAR. *littoralis*, Fries (sp.); margins of leaves and sepals usually puberulous, cymes compact, calyx-lobes longer, corolla rather larger, capsule not exceeding the calyx.—Sandy shores, local; not found in Ireland.

Sub-sp. LATIFOLIA, Sm. (sp.); glabrous, 2–4 in., stout, leaves all broad subacute 5–7-nerved, cymes compact, flowers all subsessile, calyx-lobes about as long as the corolla-tube, corolla ⅛ in. diam., capsule scarcely exceeding the calyx.—Sand-hills, Lancashire.

Sub-sp. PULCHELLA, *Fries* (sp.); glabrous, leaves 3–5-nerved, cymes rarely compact, flowers all pedicelled, calyx-lobes about ½ as long as the corolla-tube, corolla ¼ in. diam., lobes narrow, capsule slightly exceeding the calyx. —Wet sandy places; rare in Scotland; S. of Ireland only.

4. GENTIANA, *L.* GENTIAN.

Herbs of various habit. *Leaves* opposite. *Flowers* solitary, or in terminal cymes. *Calyx* 4–5-fid or -partite, sometimes spathaceous. *Corolla* 4–5-lobed, angles sometimes folded and produced, throat naked bearded or with 5 scales. *Stamens* 4–5, inserted on the corolla-tube, included; anthers dehiscing extrorsely. *Disk* annular. *Ovary* 1-celled; style 0 or short, stigmas 2 persistent recurved; ovules many. *Capsule* septicidally 2-valved, many-seeded. *Seeds* immersed in the broad membranous placentas.—DISTRIB. Temp. regions and high mountains, rare in arctic; species about 150.—ETYM. The classical name.

1. **G. campestris,** *L.*; annual, calyx ebracteate 4-partite, lobes very unequal, corolla-tube subcylindric, throat ciliate.

Moist especially hilly pastures; ascending to 2,400 ft. in the Highlands; fl. July-Oct.—*Stem* 4–12 in., simple below. *Radical leaves* obovate-spathulate; cauline ovate-oblong or lanceolate, acute, 3–7-nerved. *Flowers* 1 in., cymosely panicled, pedicelled. *Calyx-tube* short; outer lobes oblong-ovate, acuminate, inner much narrower. *Corolla* pale lilac; lobes oblong, acute. *Capsule* subsessile.—DISTRIB. Europe (excl. Turkey), W. Siberia.

2. **G. Amarel'la,** *L.*; annual, calyx ebracteate 5-lobed, lobes nearly equal, corolla-tube subcylindric, throat ciliate.

Dry pastures; ascending to 2,100 ft. in Yorkshire; fl. July–Sept.—Habit and stature of *G. campestris,* but calyx less deeply divided, lobes 5, much smaller, subulate-lanceolate.—DISTRIB. Europe (Arctic), Siberia, Dahuria.

Sub-sp. AMAREL'LA proper; calyx-lobes subequal from half as long to as long as the corolla-tube.

Sub-sp. GERMAN'ICA, *Willd.* (sp.); larger, stouter, calyx-lobes unequal, 2 broader and more acute, much shorter than the corolla-tube.

3. **G. Pneumonan'the,** *L.*; perennial, calyx 2-bracteate, lobes 5 equal, corolla narrow-campanulate, throat naked.

Moist heathy places, from Cumberland to Dorset, and from York and Norfolk to Anglesea, rare and local; fl. Aug.–Sept.—*Rootstock* short. *Stems* 1–2 ft., few, slender, scaly below, simple or nearly so, leafy above. *Leaves* 1–1½ in., linear-oblong, obtuse, 1–3-nerved. *Flowers* 1–2 in., few, axillary and terminal, shortly pedicelled; bracts 2, long, linear. *Calyx-tube* obconic; lobes linear, obtuse, much shorter than the corolla, which is pale blue outside and bright blue within. *Capsule* stipitate.—DISTRIB. Europe (excl. Greece and Turkey), N. Asia, N. America (a form).

4. **G. ver'na,** *L.*; perennial, calyx 2-bracteate, lobes 5 equal, corolla salver-shaped, throat with 2-fid scales between the lobes.

Wet subalpine limestone rocks of York and Durham, ascending to 2,400 ft. in Upper Teesdale; Mayo, Galway, and Clare; fl. May–June.—Tufted, stoloniferous. *Radical leaves* rosulate, ovate or ovate-oblong, obtuse or subacute, 1-nerved; cauline few, smaller, oblong. *Stem* 1–2 in., curved or ascending. *Flowers* 1 in. diam., solitary, sessile; bracts foliaceous. *Calyx-tube* large, 5-winged; lobes acute, much shorter than the corolla-tube. *Corolla* bright blue; lobes ovate, obtuse. *Capsule* subsessile.—DISTRIB. Europe from France and Germany to Spain and Turkey, Siberia, W. Asia.

5. **G. niva'lis,** *L.*; annual, calyx 2-bracteate, lobes 5 equal, corolla funnel-shaped, throat with a 2-fid scale between each lobe.

High alpine rocks of the Breadalbane and Clova Mts., from 2,700–3,000 ft., very rare; fl. Aug.–Sept.—*Stem* slender, 2–8 in., simple or branched above. *Radical leaves* ½–¾ in., few, obovate-oblong, obtuse or acute; cauline smaller, in distant pairs, all 3–5-nerved. *Flowers* ½–¾ in., solitary or few, shortly pedicelled; bracts small, oblong. *Calyx* narrow-campanulate, 5-angled and ribbed; lobes subulate, much shorter than the corolla-tube. *Corolla* ¾ in. diam., blue; lobes ovate, obtuse. *Capsule* subsessile.—DISTRIB. Arctic, Northern and Mts. of Mid. Europe, Arctic America.

5. MENYAN'THES, *Tournef.* BUCK- OR BOG-BEAN.

A perennial scapigerous marsh herb. *Rootstock* creeping. *Leaves* alternate, 3-foliolate, petioles sheathing. *Flowers* racemose; pedicels bracteate. *Calyx* 5-partite. *Corolla* fleshy, funnel-shaped, deciduous, limb 5-partite,

segments fimbriate on the disk, induplicate valvate in bud. *Stamens* 5, inserted on the corolla-tube. *Disk* of 5 hypogynous glands. *Ovary* 1-celled; style filiform, persistent, stigma 2-lobed; ovules in 1 series on 2 parietal placentas. *Capsule* globose, 1-celled, obscurely loculicidally 2-valved, many-seeded. *Seeds* small, testa polished.—DISTRIB. Europe (Arctic), Siberia, Dahuria, N.W. India, N. America.—ETYM. obscure.

1. **M. trifolia'ta,** *L.*; leaflets subsessile oblong or obovate.

Marshes and spongy bogs; ascending to 1,800 ft. in the Lake district; fl. May–July.—*Rootstocks* stout, matted. *Leaflets* 1½–3 in., obtuse, quite entire, ultimate nerves with free tips within the larger areoles; petioles 3–7 in., sheath long narrow. *Scape* longer than the petioles, many-flowered. *Flowers* ¾ in. diam., white or pink, bearded; pedicels ¼–½ in., stiff, spreading; bracts broad, short, obtuse. *Sepals* oblong, obtuse. *Corolla-lobes* recurved, subacute. *Stamens* reddish. *Capsule* apiculate.—Bitter, reputed tonic and febrifuge; used to add bitterness to beer; rootstock full of starch, hence eaten.

6. LIMNAN'THEMUM, *Link.*

Perennial water-herbs. *Leaves* alternate or opposite, floating, peltate or cordate. *Flowers* yellow in sessile umbels that terminate short axillary branches. *Calyx* 5-partite. *Corolla* rotate, membranous, deciduous; segments 5–8, erose, with 5–8 fimbriate scales at the base, margins broadly inflexed in bud. *Stamens* 5–8, inserted on the very short corolla-tube. *Disk* of 5–8 hypogynous glands. *Ovary* 1-celled; style persistent, stigmas 2 simple or lobed; ovules many, placentas 2 parietal. *Capsule* bursting irregularly, few- or many-seeded. *Seeds* small, testa smooth or muricate.—DISTRIB. Temp. and trop. regions; species about 12.—ETYM. λίμνη, *a pool*, and ἄνθος, *a flower*.

1. **L. nymphæoi'des,** *Link*; leaves opposite on the flowering-stems. *Villarsia nymphæoides*, Vent.

Still waters, rare, from Norfolk and Gloucester to Sussex; naturalized further north, and in Scotland and Ireland; fl. July–Aug.—*Rootstock* creeping, with alternate leaves. *Flowering-stems* floating; their branches short, in the axils of opposite leaves. *Leaves* all petioled, orbicular, base deeply cordate, quite entire, green shining purple-spotted above, opaque purplish and studded with glands beneath; petioles of radical leaves long, slender, not sheathing; of floating leaves shorter, stout, sheathing. *Peduncles* 1–3 in., crowded. *Flowers* 1 in. diam., subumbellate, opening one at a time. *Sepals* linear-oblong, obtuse. *Corolla* bright yellow; lobes erose or fimbriate. *Capsule* flagon-shaped, green. *Seeds* few, compressed, winged, ciliate.—DISTRIB. Europe from Denmark southwards, N. Asia, W. Asia to N.W. India.

ORDER XLVIII. POLEMONIA'CEÆ.

Annual or perennial herbs (rarely shrubs). *Leaves* alternate, or the lower opposite, entire or divided, exstipulate. *Flowers* in terminal centrifugal 2-chotomous cymes, usually blue or white. *Calyx* inferior, 5-lobed, imbricate in bud. *Corolla* slightly perigynous, regular or nearly so, 5-partite; lobes contorted in bud. *Stamens* 5, inserted on the corolla-tube,

usually unequal; anthers fixed dorsally, 2-celled, dehiscence introrse, pollen subglobose reticulate. *Disk* fleshy. *Ovary* 3-celled; style simple, stigmas 3 linear revolute; ovules 1 or more, attached to the inner angle of each cell, amphitropous. *Capsule* 3-celled, loculicidally 3-valved; valves separating from the persistent axis; cells 1- or many-seeded. *Seeds* angled or plano-convex, testa spongy sometimes winged, hilum ventral, albumen fleshy; embryo axile, cotyledons subfoliaceous.—DISTRIB. Chiefly arctic and temp., especially W. American; genera 17; species about 100.—AFFINITIES. With *Convolvulaceæ*.—PROPERTIES unimportant.

1. POLEMO'NIUM, *L.* JACOB'S-LADDER.

Perennial herbs. *Leaves* alternate, pinnate. *Flowers* corymbose, usually ebracteate. *Calyx* campanulate, 5-lobed. *Corolla* rotate; lobes 5, obovate. *Stamens* declinate, inserted on the corolla-throat, filaments dilated and hairy at the base. *Disk* cup-shaped, crenate. *Ovary* ovoid; style filiform, stigma 3-fid; ovules many in each cell, 2-seriate. *Capsule* ovoid, 3-celled, many-seeded, loculicidally 3-valved. *Seeds* ovoid, angled, with a short wing or 0, testa thick, abounding in spiral vessels.—DISTRIB. N. temp. and arctic regions; species about 12.—ETYM. obscure.

1. **P. cæru'leum,** *L.*; leaflets 6–12 pairs subsessile. *Greek Valerian.*

Copses and streams, apparently indigenous from Stafford and Derby northwards to the Cheviots, doubtfully elsewhere; an outcast of gardens in Scotland and Ireland; fl. June–July.—*Rootstock* short, creeping. *Stems* 1–3 ft., glabrous or pubescent and glandular above, angular, fistular, leafy. *Leaves* 4–18 in.; petiole very slender, winged; leaflets ¾–1½ in., quite entire, ovate or oblong-lanceolate, acute. *Flowers* many, drooping, ½–1 in. diam., blue or white. *Calyx* campanulate; lobes oblong, acute. *Corolla-lobes* spreading, subacute. *Capsule* erect, included in the calyx. *Seeds* compressed, angular; testa costate and rugose, shortly winged.—DISTRIB. Europe (Arctic) to France and Italy, N. Asia, N.W. Himalaya, N. America.

ORDER XLIX. **CONVOLVULA'CEÆ.**

Herbs or shrubs, usually twining (rarely trees); juice often milky. *Leaves* alternate, 0 in *Cuscuta*, exstipulate. *Flowers* in axillary or terminal racemes cymes or heads, rarely solitary, often large, of all colours; pedicels often articulate with the peduncle and bracteate. *Sepals* 5, equal or unequal, in 1–3 series, persistent. *Corolla* hypogynous, regular, tubular bell- or funnel-shaped; limb 5-lobed or -angled, plaited and contorted in bud. *Stamens* 5, inserted on the corolla-tube, filaments often unequal and dilated at the base; anthers sagittate, basifixed, 2-celled, dehiscence introrse, often twisted after flowering, pollen angular or spherical. *Disk* angular, hypogynous. *Ovary* of 2–4-connate carpels, 2–4-(rarely 1)-celled; style slender, 2–4-fid, stigmas capitate linear or lamellar; ovules 1 or 2 in each cell, erect from its base, 4 in the 1-celled ovaries. *Capsule* 1–4-celled, 2–4-valved or bursting transversely at the base. *Seeds* attached to the base of the central column, erect; testa coriaceous or membranous, often villous, albumen scanty mucilaginous

(fleshy in *Cuscuta*); embryo curved, cotyledons very broad thin folded, radicle short (embryo spiral and undivided in *Cuscuta*).—DISTRIB. Chiefly trop., rarer in the temp. zones; genera 40; species about 650.—AFFINITIES. With *Cordiaceæ* and *Hydrophyllaceæ*.—PROPERTIES. Often purgative; some (*Batatas*) yield esculent roots.

SUB-ORDER I. **Convolvula'ceæ** proper. Leafy. *Albumen* scanty. *Cotyledons* foliaceous.....1. Convolvulus.

SUB-ORDER II. **Cuscu'teæ** (*Presl*, order). Leafless parasites. *Albumen* copious, fleshy. *Embryo* filiform, spiral.....2. Cuscuta.

1. CONVOL'VULUS, *L.* BINDWEED.

Slender, often perennial twining herbs; juice milky. *Leaves* alternate, often cordate or sagittate. *Flowers* axillary, solitary or corymbose, white pink purple or blue, bracteate or ebracteate. *Sepals* 5. *Corolla* funnel- or bell-shaped, limb 5-angled and -plicate. *Stamens* 5, inserted at the bottom of the corolla-tube, filaments dilated at the base. *Ovary* 2-celled; style filiform, stigmas 2 oblong or linear; ovules 2. *Capsule* 2-celled, the dissepiment sometimes imperfect. *Seeds* 2 in each cell, erect, testa hard.—DISTRIB. Temp. and trop. regions; species about 100.—ETYM. *convolvo*, to *entwine*.

SUB-GEN. 1. **Convol'vulus** proper. *Bracts* small, placed low on the peduncle. *Stigmas* slender.

1. **C. arven'sis,** *L.*; leaves hastate or sagittate, entire or sinuate. *Small Bindweed.*

Fields and waste places, from Renfrew and Moray southwards; local in Scotland; chiefly in S.E. Ireland; fl. June-Sept.—Glabrous or pubescent. *Rootstock* slender, extensively creeping underground. *Stems* many, 6–24 in., trailing or twining, slender. *Leaves* 1–3 in., very variable, apiculate, lobes acute. *Flowers* 1 in. diam., white or pink; peduncle recurved in fruit, solitary, 1–4-flowered, 4-gonous; bracts 2, small, linear. *Sepals* unequal, broadly oblong, obtuse. *Capsule* 2-celled, globose, apiculate. *Seeds* 4, obtusely 3-gonous, muricate.—DISTRIB. Europe, N. Africa, all N. and W. Asia to N.W. India.—A pest to agriculture.

SUB-GEN. 2. **Calyste'gia,** *Br.* (gen.). *Bracts* 2, large, enclosing the calyx. *Stigmas* broad.

2. **C. se'pium,** *L.*; stem twining, leaves hastate or sagittate.

Hedges and thickets from Isla and Elgin southwards, and in Ireland; fl. June–Aug.—Glabrous, rarely pubescent.—*Rootstock* stout, fleshy, creeping. *Stems* twining, 3–5 ft., slender. *Leaves* 3–5 in., membranous, entire, obtuse or acute, deeply cordate, lobes rounded or angled. *Flowers* 2 in. diam., white or pale pink; peduncle solitary, 1-flowered, 4-gonous; bracts ovate-cordate or triangular. *Sepals* subequal, ovate-lanceolate. *Capsule* ½ in. diam., globose, apiculate, 1-celled above, 2-celled below. *Seeds* smooth, obtusely 3-gonous.—DISTRIB. Europe, Siberia, Dahuria, N. Africa, temp. N. and S. America, Australia, New Zealand.—Rootstock purgative.

3. **C. Soldanel'la,** *L.*; stem procumbent, leaves orbicular or reniform.

Sandy sea-shores from Isla and Forfar southwards, rather local in Ireland; fl. June–Aug.—Glabrous. *Rootstock* slender, running extensively. *Stems*

6–12 in., slender, never twining. *Leaves* ½–1½ in. diam., fleshy, usually much broader than long, lobes rounded; petiole 1–3 in., suddenly dilating at the tip. *Flowers* 1–1½ in. diam., pale purple or pink; peduncle solitary, 1-flowered, 4-quetrous. *Bracts* ⅓–¾ in., broadly oblong, obtuse, shorter than the similar or retuse unequal sepals. *Capsule* large, incompletely 2-celled. *Seeds* ¼ in. diam., obtusely 3-gonous, smooth, black.—DISTRIB. Europe from Belgium northwards, N. Africa, W. Asia, S. temp. regions.

2. CUS'CUTA, *Tournef.* DODDER.

Slender, branched, twining, leafless, pink yellow or white, annual parasites. *Flowers* in compact bracteate heads (in all British species), rarely spiked. *Calyx* 4–5-fid. *Corolla* urceolate, persistent; limb 4–5-fid; tube naked, or with a ring of scales below the stamens. *Stamens* 4–5, inserted on the middle of the corolla-tube, included. *Ovary* 2-celled; styles 2, free or connate, stigmas acute or capitate; ovules 2 in each cell, erect. *Capsule* 2-celled, bursting transversely at the base, cells 2-seeded. *Seeds* angled, embryo filiform, undivided, spirally coiled round the fleshy albumen, radicle thickened.—DISTRIB. Temp. and trop. regions; species about 40.—ETYM. doubtful.

1. **C. europæ'a,** *L.*; sepals erect obtuse, tips spreading, corolla twice as long ventricose above, scales short or 0, stamens included.

On nettles, vetches, &c. in England, from York to Dorset, rare; fl. July–Sept. —*Stems* as thick as twine, reddish or yellow. *Flower-heads* ½–¾ in. diam., globose, tinged with red. *Sepals* fleshy at the base only. *Corolla-lobes* about as long as the tube, obtuse, spreading. *Scales* appressed to the corolla-tube, remote, 2-fid. *Styles* included.—DISTRIB. Europe, N. Africa, Siberia.

2. **C. Epithy'mum,** *Murr.*; sepals suberect acute shorter than the cylindric corolla-tube, scales concealing the ovary toothed, stamens exserted.

On Furze, Thyme, Ling, &c. from York southwards; said to grow in Galloway, Scotland, and formerly near Drogheda, Ireland; fl. July–Oct.— *Stems* filiform, very slender, reddish. *Heads* ¼–¾ in. diam., variable in colour. *Corolla-lobes* spreading. *Scales* large, incurved. *Styles* exserted.— DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia.

VAR. *Trifo'lii,* Bab. (sp.), does not seem entitled to sub-specific rank. Mr. E. T. Bennett has sent me, from Hazlemere, specimens of the two forms grown upon heath, one with pink flowers and reddish anthers, and the other (*Trifolii*), with white flowers and yellow anthers, the scales in both ⅔ the length of the corolla-tube.

C. EPILI'NUM, *Weihe;* sepals acute appressed to the equally long inflated corolla-tube, scales small distant toothed, stamens included.

On Flax in England, Scotland, and Ireland, but not naturalized; fl. July–Aug. —About as large and stout as *C. europæa,* but usually paler and more succulent. *Sepals* fleshy, triangular-ovate. *Corolla-lobes* obtuse. *Scales* incurved as in *C. Epithymum,* but smaller, distant, often 2-fid. *Styles* short, included.—DISTRIB. Europe (excl. Russia).

ORDER L. BORRAGIN'EÆ.

Herbs, rarely shrubby below, usually hispid scabrid or pilose. *Stems* terete. *Leaves* alternate, quite entire or sinuate; nerves usually strong, sunk above, very prominent below; exstipulate. *Flowers* regular or irregular, bracteate or not, in simple forked spiked or racemed often scorpioid cymes, rarely axillary. *Calyx* persistent, 5-lobed or -partite, valvate in bud. *Corolla* hypogynous, rotate tubular campanulate or salver-shaped; throat often closed by hairs or hollow folds placed opposite the 5 lobes, imbricate in bud. *Stamens* 5, inserted on the corolla-tube or throat, filaments usually short; anthers dorsally inserted, 2-celled, bursting inwards, often subulate. *Disk* 0, or confluent with a tumid receptacle. *Ovary* of 2 2-lobed 2-celled carpels connate at the very base; style simple, arising from the base of the carpels, stigma simple or 2-fid; ovules solitary in each cell, ascending, anatropous. *Fruit:* the 4 lobes of the ovary become indehiscent 1-seeded nutlets, inserted on the receptacle, which is continuous with the base of the style. *Seed* straight or curved, attachment basal or ventral, narrow or broad, often concave with thickened margins, testa membranous, albumen 0 or scanty and fleshy; embryo straight or curved, cotyledons foliaceous, radicle superior.—DISTRIB. All climates, abundant in S. Europe and E. Asia; genera 50; species 600.—AFFINITIES. With *Verbenaceæ*, *Labiatæ*, and *Convolvulaceæ*.—PROPERTIES. Mucilaginous and emollient; often abounding in alkalies. Roots often yield purple or brown dyes.—The above character does not include the tropical suborder *Heliotropeæ*, chiefly distinguished by the obscurely lobed ovary.

TRIBE I. **E'CHIEÆ.** *Corolla* irregular; throat usually naked. *Nutlets* inserted by a flat base on the flat receptacle. *Stamens* exserted...1. Echium.

TRIBE II. **ANCHU'SEÆ.** *Corolla* regular; throat closed with scales. *Nutlets* inserted by broad cup-shaped bases on the flat receptacle.

Corolla rotate. Anthers exserted, conniving in a cone.....1*. *Borrago.*
Corolla tubular, 5-toothed. Anthers included .....2. Symphytum.
Corolla salver-shaped .....3. Anchusa.

TRIBE III. **LITHOSPER'MEÆ.** *Corolla* regular; throat naked or closed by scales. *Nutlets* inserted by small flat bases to the flat receptacle.

Calyx-tube 0. Stamens included. Nutlets stony .....4. Lithospermum.
Calyx-tube short. Stamens protruding. Nutlets fleshy .....5. Mertensia.
Calyx-tube long, funnel-shaped. Stamens included. Nutlets smooth. 6. Pulmonaria.
Calyx-tube long. Corolla salver-shaped. Nutlets smooth .....7. Myosotis.

TRIBE IV. **CYNOGLOS'SEÆ.** *Corolla* regular; throat naked or closed with scales. *Nutlets* inserted by broad ventral surfaces on an elevated receptacle.

Calyx-lobes leafy. Nutlets granulate .....7*. *Asperugo.*
Calyx-lobes not leafy. Nutlets with hooked bristles .....8. Cynoglossum.

1. E'CHIUM, *Tournef.* BUGLOSS.

Herbs, sometimes shrubby, usually large, stout, hispid or scabrous with tuberous-based hairs. *Leaves* entire. *Flowers* white red purple or blue, in spiked or panicled racemes. *Calyx* 5-partite. *Corolla-tube* cylindric or funnel-shaped; throat dilated; limb unequally 5-lobed. *Filaments* unequal, adnate to the corolla below, exserted. *Style* filiform, stigma 2-lobed. *Nut-*

lets 4, inserted by flat bases on the flat receptacle, ovoid or turbinate, wrinkled, scabrid.—DISTRIB. Chiefly S. Europe and Oriental; species 50. —ETYM. ἔχις, *a viper*, of disputed application.

1. **E. vulga're,** *L.*; cauline leaves lanceolate or oblong, rounded at the base, cymes short, calyx exceeding the corolla-tube, stamens much protruded. *E. italicum*, Huds. not of L. *Viper's Bugloss.*

Waste ground on light soils in England; an alien or colonist in Scotland, *Watson;* S.E. of Ireland; fl. June–Aug.—*Root* fusiform, annual or biennial. *Stem* 1–3 ft., erect or ascending below, stout, leafy. *Radical leaves* petioled, 4–8 in.; cauline sessile, acute, rounded at the base. *Cymes* 1 in. or more, axillary, recurved, lengthening in fruit, panicled towards the ends of the branches; bracts and calyx-lobes linear. *Corolla* ¾ in., red-purple in bud, then bright blue, rarely white. *Nutlets* angular, rugose.—DISTRIB. Europe, N. Africa, W. Siberia; introd. in N. America.

2. **E. plantagin'eum,** *L.*; cauline leaves linear-oblong cordate at the base, calyx much shorter than the corolla-tube, cymes elongate, stamens slightly protruded. *E. viola'ceum*, Brit. Fl., not of L.

S.W. of Jersey; fl. June–Aug.—*Root* fusiform, annual or biennial. *Stem* 1–3 ft., erect or ascending, diffusely branched. *Leaves*, radical 4–6 in., lanceolate, petioled; cauline spreading, obtuse, sometimes dilated at the base. *Cymes* 4–6 in., spreading, curved. *Calyx-lobes* subulate-lanceolate. *Corolla* 1 in., dark blue-purple. *Nutlets* as in *E. vulgare.*—DISTRIB. Spain and Mediterranean region to Greece.

1*. *BORRA'GO, Tournef.* BORAGE.

Annual or perennial herbs, hispid with tuberous based hairs. *Flowers* in lax forked cymes, bracteate, blue. *Calyx* 5-partite. *Corolla* rotate, throat closed by notched scales, lobes acute. *Stamens* 5, on the throat of the corolla, filaments stout, concave, with an obtuse tooth above; anthers elongate, mucronate, conniving, exserted. *Style* filiform, stigma capitate. *Nutlets* 4, rugose, inserted by a truncate concave base on a flat fleshy receptacle.—DISTRIB. S. Europe, N. Africa; species 3.—ETYM. doubtful.

B. OFFICINA'LIS, *L.*; corolla rotate, scales broad erect notched.

Waste ground, near habitations, in England and the Channel Islands only, rare; an alien, *Watson;* fl. June–July.—*Root* annual or biennial. *Stem* 1–2 ft., stout, succulent, leafy, branched. *Leaves* waved or sinuate-toothed, subacute; radical 4–6 in., ovate-lanceolate, petioles broad, winged; cauline sessile or contracted towards the auricled base, upper oblong. *Cymes* axillary and terminal, few-flowered, branched; pedicels 1–1½ in., decurved; bracts linear or lanceolate. *Calyx-lobes* subulate-lanceolate. *Corolla* ¾ in. diam., bright blue; lobes triangular-ovate. *Anthers* purple-black, spurred at the back. *Nutlets* ⅛ in.—DISTRIB. Mid and S. Europe, N. Africa; introd. in America.—Used as a cordial, but has no sensible properties.

2. SYM'PHYTUM, *Tournef.* COMFREY.

Perennial coarse hispid herbs, with tuberous or fascicled roots. *Leaves*, radical petioled, cauline sessile or decurrent, upper often opposite. *Flowers* in terminal forked cymes, bracteate, white blue purple or yellow. *Calyx* 5-partite or -toothed. *Corolla* tubular, dilated above the middle,

shortly 5-toothed, throat closed by elongate ciliate scales. *Stamens* 5, on the middle of the corolla, filaments slender; anthers long, included. *Style* slender, stigma capitate. *Nutlets* 4, ovoid, smooth, inserted by a broad perforated base on a flat receptacle, rim of the perforation striate.—DISTRIB. Europe, W. Asia; species 15.—ETYM. doubtful.

1. **S. officina'le,** *L.*; stem broadly winged above, leaves decurrent.

River-banks and watery places, from Forfar southwards; a denizen in N. Britain, *Watson;* frequent in Ireland; fl. May–June.—Hispid and hairy. *Rootstock* branched; roots fleshy, fibrous. *Stem* 1–3 ft., stout, angular, branched. *Leaves* ovate-lanceolate, radical 4–8 in., petioles long, winged; cauline shortly petioled. *Cymes* scorpioid; flowers drooping; pedicels ¼–½ in. *Calyx-lobes* small, narrow-lanceolate. *Corolla* ¾ in., yellow red or purple. *Nutlets* ⅛ in., shining.—DISTRIB. Europe, W. Siberia; a garden escape in the U. States.—An old styptic; young leaves sometimes cooked and eaten. VAR. 1, *officina'le* proper; corolla ochreous.—VAR. 2, *pa'tens,* Sibthorp (sp.); corolla purple.

2. **S. tubero'sum,** *L.*; stem hardly winged, leaves scarcely decurrent.

Copses in wet places, from N. Wales and York, to Isla and Elgin; most common in S. of Scotland; absent from Ireland; fl. June–July. -Hairy, not hispid, often glandular. *Rootstock* short, horizontal; root-fibres slender. *Stem* 1–2 ft., rather slender, leafy. *Radical leaves* much as in *S. officinale* in form, but longer petioled. *Flowers* rather smaller, ochreous—DISTRIB. Mid. Europe from France to Turkey.

3. ANCHU'SA, *L.* ALKANET.

Annual or perennial herbs, usually villous and hispid. *Flowers* in scorpioid cymes, usually bracteate, blue or purple, rarely white or yellow. *Calyx* 5-fid or -partite. *Corolla-tube* straight or curved, throat closed by hairs or scales; limb oblique or spreading, 5-partite. *Stamens* included. *Nutlets* 4, rugose or granulate, inserted by a very broad deeply concave base on a flat receptacle, rim of the concavity often wrinkled.—DISTRIB. Europe, W. Asia; species 30.—ETYM. doubtful.

SECTION 1. **Lycop'sis,** *L.* (gen.). *Corolla-tube* curved, equalling or exceeding the oblique limb. *Nutlets* with the ring equal at the base.

1. **A. arven'sis,** *Bieb.*; hispid, bristles tuberous-based. *Bugloss.*

Cornfields and waste places in light soils; ascends to 1,000 ft. in the Highlands; fl. June–July.—Annual; root fusiform. *Stem* simple below, ½–1½ ft., angular, rather slender. *Leaves,* radical 1–4 in., petioled, obovate-lanceolate; cauline linear-oblong, sessile, acute, margin waved and toothed, upper ½-amplexicaul. *Cymes* 4–5 in., terminal, simple or forked, short, at length elongate, drooping, recurved; bracts leafy; flowers subsessile. *Calyx-lobes* ½ in., narrow. *Corolla* ¼ in. diam., bright blue, scales white. *Nutlets* small, reticulate.—DISTRIB. Europe, W. Siberia, W. Asia to N.W. India; introd. in the U. States.

SECTION 2. **Anchu'sa** proper. *Corolla-tube* straight, equalling or exceeding the limb. *Nutlets* with the basal ring not produced.

A. OFFICINA'LIS, *L.*; densely softly hispid, leaves narrow-lanceolate.

Ballast hills, Hartley Links, Northumberland; also found near Glasgow; an

alien, *Watson;* fl. June–July.—*Root* stout, biennial. *Stem* 1–2 ft., angled, simple or branched. *Leaves,* radical 3–6 in., gradually narrowed into long winged petioles; cauline oblong-lanceolate or linear-oblong, sessile, uppermost ½-amplexicaul. *Cymes* forked or in pairs, 1–2 in., lengthening to 4–6 in.; bracts and calyx-lobes ovate-lanceolate; flowers subsessile. *Corolla* ¼ in. diam., violet-blue, scales white papillose. *Nutlets* small, brown.—DISTRIB. Europe, W. Asia.

SECTION 3. **Caryolo'pha,** *Fisch. et Trant.* (gen.). *Corolla-tube* straight, shorter than the limb. *Nutlets* with the ring produced towards the style.

A. SEMPERVI'RENS, *L.*; hispidly hairy, leaves ovate acute.

Hedges and waste places from Ross southwards, rare and local, and in Ireland; a denizen or alien, *Watson;* fl. May–June.—*Root* stout, perennial. *Stem* 1–2 ft., simple. *Leaves,* radical 8–12 in., oblong-ovate, long-petioled; cauline ovate, shorter petioled. *Cymes* in pairs, very hispid, subcapitate, long-peduncled, 2-bracteate, not lengthening much, axillary; peduncles 2–3 in., spreading, very slender; bracts ½–1 in., ovate-lanceolate; flowers shortly pedicelled. *Calyx-lobes* linear. *Corolla* ¾ in. diam., bright blue, scales white. *Nutlets* small, reticulate.—DISTRIB. W. Europe from Belgium to Lombardy.

4. LITHOSPER'MUM, *Tournef.* GROMWELL.

Annual or perennial herbs, sometimes shrubby, hispid or hairy. *Flowers* in bracteate cymes. *Calyx* 5-partite. *Corolla* funnel- or salver-shaped, throat naked or with 5 tumid folds; lobes 5, spreading. *Anthers* oblong, included in the corolla-tube. *Style* simple, stigma capitate obscurely lobed. *Nutlets* 4, bony or stony, inserted by a truncate base on a flat receptacle, smooth or rugose.—DISTRIB. Europe, temp. Asia and America; species about 50.—ETYM. λίθος and σπέρμα, from the *stony nutlets.*

1. **L. officina'le,** *L.*; perennial, stems many all erect branched and flowering, leaves ½-amplexicaul narrow-lanceolate, nutlets smooth white.

Copses, hedgebanks, &c. from Ross southwards; rare and doubtfully native in Scotland; rather rare in Ireland; fl. June–July.—*Rootstock* stout, woody. *Stem* 1–3 ft., rough with the tuberous bases of the stiff hairs, very leafy. *Leaves* 2–4 in., pubescent above, strigose beneath. *Cymes* capitate, small, strigose, on short leafy axillary branches; bracts longer than the calyx; flowers subsessile. *Calyx-lobes* equalling the corolla. *Corolla* ½ in. diam., yellow-white. *Nutlets* 1–2, narrowed upwards, shining.—DISTRIB. Europe, W. Asia, Siberia, Dahuria; introd. in N. America.

2. **L. arven'se,** *L.*; annual, stems solitary erect branched, leaves sessile ½-amplexicaul linear-oblong, nutlets grey shining wrinkled.

Cornfields and waste places, from Ross southwards, and in Ireland; fl. May–June.—*Root* tapering. *Stem* 10–16 in., stout, flexuous, shortly hispid. *Leaves,* radical obovate-lanceolate, petioled; cauline 2–3 in., obtuse. *Cymes* short, terminal; bracts large, leafy; pedicels very short. *Calyx-lobes* narrow-linear, almost equalling the corolla. *Corolla* ½ in., cream-white. *Nutlets* narrowed upwards.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India; introd. in the U. States.—Yields a red dye.

3. **L. purpu'reo-cæru'leum,** *L.*; perennial, barren stems creeping, flowering erect, leaves subsessile narrow-lanceolate, nutlets white smooth.

Copses on limestone and chalk, very rare, Wales, Somerset, Devon, Kent; fl. June–July.—*Rootstock* creeping, woody, slender. *Stems* 1 ft., scabrid, flowering 1–2 ft., leafy, rigid, simple or branched. *Leaves* 1½–3 in., rather softly strigose. *Cymes* terminal, few-flowered; bracts large, leafy; pedicels very short. *Calyx-lobes* very slender, much shorter than the corolla. *Corolla* ¾ in., bright blue-purple. *Nutlets* 1–2, nearly globose, shining.—DISTRIB. Europe from Belgium southwards.

5. MERTEN'SIA, *Roth.*

Perennial herbs. *Leaves* usually obovate, lower petioled, upper sessile. *Flowers* in terminal cymes, blue-purple. *Calyx* 5-fid or -partite. *Corolla-tube* cylindric, limb campanulate, 5-fid or -partite, throat naked or with 5 transverse folds between the stamens. *Stamens* 5, towards the top of the corolla-tube. *Style* filiform, lengthened after flowering, stigma obtuse. *Nutlets* 4, inserted by a contracted base on a small 2–4-lobed receptacle, rather fleshy, smooth or rough.—DISTRIB. N. and Arctic Europe, Asia, and America; species 20.—ETYM. Prof. F. C. Mertens, a German botanist.

1. **M. marit'ima,** *Don;* glabrous, glaucous, leaves ovate or obovate.

Sea-shores, Wales, Lancashire, and Cumberland, common on the W. coast of Scotland, rare on the E.; N. and E. of Ireland; fl. May–June.—Succulent. *Rootstock* fleshy, dark brown, branched, stoloniferous. *Stems* 1–2 ft., decumbent, leafy, much branched. *Leaves* 2-farious, 1–3 in., lower petioled, upper sessile, fleshy, marked with prominent callous points when dry. *Cymes* dichotomous, with 2 opposite leafy bracts at the base; pedicels short, decurved in fruit. *Calyx* angular in fruit; lobes ovate. *Corolla* ¼ in. diam., campanulate, 5-lobed to the middle, pink then blue, throat with 5 folds. *Nutlets* flattened, large, fleshy, outer coat becoming inflated and papery, rounded at the back.—DISTRIB. Europe (Arctic) southwards to Denmark, N. and Arctic shores of Asia and America.

6. PULMONA'RIA, *Tournef.* LUNGWORT.

Perennial herbs; rootstock creeping. *Radical leaves* usually terminating sterile branches. *Flowering-stems* simple. *Cymes* terminal. *Flowers* often polygamous or dimorphic, purple white or pink in bud. *Calyx* 5-angled at the base, 5-fid, after flowering campanulate, lobes erect. *Corolla* funnel-shaped, 5-cleft, with 5 pencils of hairs between the stamens. *Stamens* 5, included. *Stigma* subglobose, 2-lipped. *Nutlets* 4, turbinate, smooth, sessile by a truncate base on a flat receptacle.—DISTRIB. Europe, N. Asia; species 5.—ETYM. *pulmo,* from its former use in *lung* complaints.

1. **P. angustifo'lia,** *L.*; leaves narrow-lanceolate cauline sessile.

Copses, &c. on clay soil; Isle of Wight, Hants, and Dorset; fl. April–June.—*Rootstock* short, stout; root-fibres fleshy. *Stem* 1–1½ ft., hairy, hardly hispid, brittle. *Leaves,* radical 6–10 in., petioled, often spotted with pale green; cauline sessile, much smaller, more oblong, acute, ½-amplexicaul. *Cymes* short, much incurved, bracts leafy; pedicels rather slender. *Calyx-lobes* lanceolate, ⅓ in., enlarging in fruit. *Corolla* ¾ in., pink, then bright blue. *Nutlets* smooth, black.—DISTRIB. Europe, excl. Greece and Turkey.

P. OFFICINA'LIS, *L.*; leaves ovate or ovate-lanceolate.

Woods and copses, S. of Scotland and England; rare and naturalized only.—

Habit, &c. of *P. angustifolia*, but the leaves are of a very different form, and always blotched with pale green, and the flowers are pale purple.—DISTRIB. Europe.

7. MYOSO'TIS, *L.* SCORPION-GRASS.

Annual or perennial strigose herbs. *Radical leaves* petioled; cauline sessile, linear-oblong. *Cymes* terminal, scorpioid; flowers small, bracteate or not. *Calyx* 5-toothed or -cleft. *Corolla* salver- or funnel-shaped, throat closed by 5 short notched scales; limb 5-fid, lobes contorted in bud. *Anthers* included, connective slightly produced. *Style* short, stigma capitate. *Nutlets* 4, minute, usually highly polished, compressed or 3-gonous, attached by a small base to a small receptacle.—DISTRIB. N. and S. temp. regions, most common in Europe and Australia; species about 25.—ETYM. *μύς* and *οὖς*, from the leaves resembling a *mouse's ear.*

SECTION 1. Perennial. *Hairs* of stem appressed or spreading. *Pedicels* slender, longer than the calyx. *Calyx* campanulate, strigose with straight appressed hairs only.

1. **M. palus'tris,** *With.*; hairs scanty slightly spreading or appressed, calyx-lobes triangular equalling ¼–½ of the tube, corolla ⅓–½ in. diam., style nearly equalling the calyx. *Forget-me-not.*

Wet places, from Forfar southwards; fl. May–July.—Light green and rather shining. *Rootstock* creeping; stolons creeping, subterranean, with small leaves. *Stem* 1–2 ft., erect or ascending, rather stout, flexuous. *Leaves* 1–3 in., linear-oblong or narrowly spathulate, obtuse; upper sessile or shortly decurrent. *Cymes* variable, flowering pedicels ⅛–¼ in. *Corolla* sky-blue, disk yellow, lobes retuse. *Nutlets* small, black, bordered, hard keeled in front.—DISTRIB. Europe (Arctic), Siberia, Dahuria; introd. in N. America.

VAR. 1, *palus'tris* proper; stem with lax spreading hairs.—VAR. 2, *strigulo'sa*, Reich. (sp.); stem more erect, with more copious appressed hairs, leaves sessile, flowers smaller.

2. **M. lingula'ta,** *Lehm.*; hairs appressed, calyx-lobes triangular nearly as long as the tube, corolla ⅛ in. diam., style much shorter than the calyx. *M. cæspitosa*, Schultz.

Wet places, ascending to 1,600 ft. in Yorkshire, &c.; fl. May–Aug.—Light green, tufted, rather shining. *Rootstock* short, without stolons. *Stem* 6–18 in., much branched from the base, branches slender. *Leaves*, radical spathulate-oblong, polished; cauline 1–2½ in., linear-oblong, tip rounded, narrowed to the sessile base. *Cymes* usually long and slender, pedicels ¼–½ in. *Calyx-lobes* oblong-ovate, obtuse. *Corolla* sky-blue, disk yellow. *Nutlets* black, bordered, not keeled in front, short, broad.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria, W. Asia to the Himalaya, N. America.—This and the preceding are the only species with bright green shining foliage.

3. **M. re'pens,** *Don*; hairs long spreading, calyx-lobes narrow acute exceeding the tube, corolla ¼ in. diam., style nearly as long as the calyx.

Wet places, most common in Scotland; ascends to 2,200 ft. in Yorkshire; fl. June–Aug.—*Rootstock* short; stolons creeping above ground, leafy, rooting at the tip only. *Stem* 4–18 in., very slender, branched, flexuous. *Leaves*, radical obovate-spathulate; cauline 1–2 in., linear-oblong or oblong-obovate, usually broad at the base. *Cymes* slender, elongate; pedicels very slender,

sometimes ¾ in., lower often axillary or bracteate, much decurved in fruit. *Nutlets* short, bordered, not keeled in front. *Flowers* sky-blue, disk yellow. —DISTRIB. uncertain.

SECTION 2. *Hairs* of stem spreading. *Calyx* with spreading and hooked hairs.

* *Pedicels usually much longer than the calyx.*

4. **M. sylvat'ica,** *Hoffm.*; stolons 0, lower leaves petioled, calyx campanulate cleft ⅔ of the way, with few straight and many incurved or hooked hairs, closed in fruit, corolla ¼ in. diam. flat.

Dry woods, &c. from Aberdeen southwards; ascends to 1,200 ft. in Yorkshire; absent from Ireland; fl. May–Sept.—Biennial or perennial. *Rootstock* 0 or short. *Stem* ½–2 ft., branched from the base, erect or the lateral branches ascending. *Leaves* 1½–2½ in., acute or apiculate, hairs spreading. *Cymes* very lax in fruit; pedicels about twice as long as the calyx; corolla bright blue, tube very short. *Nutlets* dark-brown, bordered, keeled at the tip in front.—DISTRIB. Europe (Arctic), Canaries, Siberia, Dahuria, W. Asia.

5. **M. alpes'tris,** *Schmidt;* perennial, lower leaves petioled, calyx campanulate cleft ⅔ of the way with many straight and few incurved or hooked hairs, open in fruit, corolla ⅓ in. diam. flat. *M. rupicola,* Sm.

Moist alpine rocks, Bon Lawers, alt. nearly 4,000 ft., and Mickle-fell, Teesdale, alt. 2,400 ft.; fl. July–Aug.—*Hairs* long, soft, spreading. *Rootstock* short, stout, branched at the base. *Stem* 5–10 in., leafy. *Leaves* 1–2 in., cauline linear-oblong, acute or obtuse. *Cymes* short, not lengthening much; pedicels short, stout, the fruiting ascending. *Calyx* large, lobes narrow. *Corolla* deep bright blue. *Style* half as long as the calyx. *Nutlets* jet-black, largest of this section, ovoid-oblong, obtuse, bordered, keeled at the tip in front.—DISTRIB. Arctic and Alpine Europe, N. Asia, and N. America.

6. **M. arven'sis,** *Hoffm.*; annual, lower leaves petioled, calyx shortly campanulate cleft ½ way or lower with few appressed and many spreading hooked hairs, closed in fruit, corolla ⅛ in. diam. usually concave.

Fields and waste places; ascends to 1,200 ft. in Yorkshire; fl. June–Aug.—Closely allied to *M. sylvatica,* but pedicels usually much longer, slender, and flowers very small and paler blue. *Nutlets* brown, bordered, keeled in front. —DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to N.W. India; possibly a native of the N. U. States.

VAR. 1, *arven'sis* proper; annual, corolla-limb concave.—VAR. 2, *umbro'sa,* Bab.; biennial, corolla-limb flatter. Shaded places.

** *Pedicels usually shorter than the calyx.*

7. **M. colli'na,** *Hoffm.*; annual, lower leaves subsessile, calyx shortly campanulate cleft ½ way with many spreading hooked and few straight hairs, open in fruit, corolla ⅛ in. diam. usually concave bright blue, tube short.

Field banks and waste grounds, from Banff southwards; ascends to 1,000 ft. in the Highlands; E. coast of Ireland, rare; fl. May–July.—*Stems* 3–12 in., usually branched from the base. *Leaves* ½–1 in., linear-oblong, obtuse or apiculate, strigose. *Cymes* very long and slender in fruit, often exceeding the leafy part of the stem; lowest flower sometimes bracteate. *Style* not half as long as the calyx. *Nutlets* turgid, brown, scarcely bordered.—DISTRIB. Europe, N. Africa, W. Asia.

8. **M. versic'olor,** *Reich.*; annual, lower leaves subsessile, calyx shortly campanulate cleft ½ way with many spreading hooked and few straight hairs, closed in fruit, corolla ⅛ in. diam. usually concave yellow then dull blue, tube long.

Waste grounds; ascends to 1,500 ft. in Northumberland; fl. April–June.—*Stems* 3–12 in., usually much branched from the base. *Leaves* ½–1 in., linear-oblong, subacute, strigose. *Cymes* elongate; flowers not secund, lowest sometimes bracteate. *Style* nearly as long as the calyx. *Nutlets* black, bordered.—DISTRIB. Europe, N. Africa, W. Asia; introd. in the U. States.

7*. *ASPER'UGO, Tournef.* MADWORT (MADDERWORT).

An annual hispid procumbent herb. *Radical leaves* petioled; cauline alternate subopposite or whorled. *Cymes* axillary, 1–3-flowered; flowers on short recurved pedicels, small, blue. *Calyx* deeply 5-lobed, with alternating teeth; lobes leafy, spreading, veined, enlarged after flowering, and forming a compressed 2-lipped laciniate covering to the fruit. *Corolla* funnel-shaped, throat closed by scales; lobes 5, rounded. *Stamens* included. *Stigma* subcapitate. *Nutlets* laterally compressed, subacute, tubercled, attached by the edge to an elevated receptacle.—DISTRIB. Europe (Arctic), W. Asia to N.W. India.—ETYM. *asper*, from the *rough* leaves.

A. PROCUM'BENS, *L.*; stem prickly, leaves linear-oblong.

Waste places, rare, from Moray southwards; a denizen, *Watson;* fl. May–July.—*Stem* 1–2 ft., stout or slender, soft, simple or branched, sharply ridged, covered with scattered short hooked prickles. *Leaves* 2–5 in., lower petioled, uppermost sessile, variable in form, obtuse or acute, thin, hispid. *Cymes* reduced to 1–3 axillary flowers; pedicels very short, decurved in fruit. *Corolla* ⅛ in. diam., blue-purple. *Fruiting-calyx* ¼ in. broad; lips unequal, fan-shaped, palmately lobed. *Receptacle* of nutlets with 2 membranous scales formed of the detached cuticle of the calyx.

8. CYNOGLOS'SUM, *Tournef.* HOUND'S-TONGUE.

Coarse hispid villous or silky biennial herbs. *Flowers* small, blue purple or white, in forked cymes, usually ebracteate. *Calyx* 5-partite. *Corolla* funnel-shaped, mouth closed by prominent scales; lobes obtuse. *Stamens* included. *Style* rigid, persistent in fruit, stigma entire or notched. *Nutlets* 4, depressed or convex, covered with hooked or barbed bristles, peltately attached to a thickened conical receptacle.—DISTRIB. Temp. and trop. regions, especially Asiatic; species about 40.—ETYM. *κύων* and *γλῶσσα, dog's tongue*, from the texture of the leaf surface.

1. **C. officina'le,** *L.*; hoary with soft rather appressed hairs, nutlets with a thickened border.

Fields and waste places, not common, from Ross and E. Scotland southwards; S.E. of Ireland, rare; fl. June–July.—*Root* fleshy, tapering. *Stem* 1–2 ft., stout, erect, branched, leafy. *Leaves*, radical 8–10 in., long-petioled, oblong or oblong-lanceolate; cauline sessile, linear-oblong or oblong-lanceolate, obtuse, rounded or cordate at the base. *Cymes* lengthening to 6–10 in.; pedicels recurved, stout, lower often bracteate. *Calyx-lobes* oblong, obtuse, enlarged to ¼ in. in fruit. *Corolla* ¼ in. diam., dull red-purple. *Nutlets* ¼ in., face flat ovate covered with short hooked spines; border

thickened.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in U. States.—Narcotic and astringent; smells like mice.

2. **C. monta'num,** *Lamk.*; scabrid with short spreading hairs, nutlets without a thickened border. *C. sylvaticum,* Hænke.

Copses and waste places in Mid. and E. England, rare, from Essex to Surrey and Northampton to Gloucester; naturalized in Perth and Forfar; near Dublin only in Ireland; fl. May–July.—Habit, &c. of *C. officinale,* but greener, more slender, with linear calyx-lobes ⅓ in. long in fruit, bluer corollas, and the spines of the nuts largest on their margins.—DISTRIB. Europe from France and Germany southwards (excl. Spain and Greece).

ORDER LI. SOLA'NEÆ.

Herbs or shrubs (rarely trees). *Leaves* alternate, or in pairs, or sub-opposite, simple lobed or pinnatisect, exstipulate. *Flowers* regular, on 1- or more-flowered supra-axillary or axillary ebracteate cymes. *Calyx* inferior, 5-fid, usually persistent, often enlarged in fruit. *Corolla* hypogynous, rotate campanulate or salver-shaped; lobes 5, imbricate plicate or induplicate-valvate in bud. *Stamens* 5, rarely unequal, inserted on the corolla-tube, short; anthers 2-celled, connivent or cohering by their tips, cells opening inwards by slits, or terminal pores. *Disk* annular, hypogynous. *Ovary* 2- or incompletely 4-celled; style simple, stigma simple or lobed; ovules many, amphitropous, placentas attached to the septum. *Fruit* a many-seeded capsule or berry. *Seeds* small, usually compressed, reniform, hilum ventral or lateral, testa thick, albumen fleshy; embryo terete, straight or curved, within or outside the albumen, radicle next the hilum.—DISTRIB. Chiefly tropical; genera 60; species about 1,000.—AFFINITIES. With *Convolvulaceæ* and *Scrophularineæ.*—PROPERTIES. Narcotic and excitant, or tonic and bitter, pungent or stimulant.

Corolla subcampanulate. Capsule 2-celled.....1. Hyoscyamus.
Corolla rotate, anthers with pores. Berry 2-celled.....2. Solanum.
Corolla subcampanulate, anthers with slits. Berry 2-celled.....3. Atropa.

1. HYOSCY'AMUS, *Tournef.* HENBANE.

Annual or biennial, heavy-scented herbs, often viscid. *Leaves* toothed or sinuate-pinnatifid. *Flowers* axillary or in bracteate scorpioid cymes. *Calyx* urceolate, 5-toothed. *Corolla* irregular, bell- or funnel-shaped; lobes 5, plaited, obtuse, unequal. *Stamens* 5, inserted at the base of the corolla-tube, declinate; anthers with slits. *Ovary* 2-celled; style simple, stigma capitate; ovules many. *Capsule* hidden in the calyx-tube, constricted in the middle, 2-celled, membranous, bursting transversely at the crown, many-seeded. *Seeds* reniform, punctate.—DISTRIB. Warm and temp. Europe, Africa, and Asia; species about 14.—ETYM. obscure.

1. **H. ni'ger,** *L.*; leaves angled toothed or subpinnatifid.

Sandy waste places from Ross and Dumbarton southwards; not native in Scotland; common in Ireland; fl. June–Aug.—Pubescent fœtid and viscid, with pale soft glandular hairs. *Stem* 1–2 ft., stout, branching, terete. *Radical leaves* 6–8 in., petioled, ovate; cauline oblong, amplexicaul, with

few large lobes or teeth. *Flowers* 2-seriate subsessile. *Calyx-tube* ovoid; limb subcylindric, 5-toothed. *Corolla* 1–1½ in. diam., lurid yellow, veined with purple; lobes broad, nearly equal. *Anthers* purple. *Calyx-tube* globose in fruit, ¾ in. diam., veined.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, W. Asia to N.W. India.—Anodyne and antispasmodic. A var. without purple veins in the corolla has been found in Surrey, Norfolk, and Edinburgh.

2. SOLA'NUM, *Tournef.* NIGHTSHADE.

Herbs or shrubs (rarely trees). *Leaves* scattered or in pairs, entire or divided. *Flowers* in the forks of the stem, or supra-axillary, rarely terminal, solitary fascicled or cymose, white or blue. *Calyx* 5–10-fid. *Corolla* rotate, tube short; lobes 5–10, plaited. *Stamens* 5, inserted on the corolla-throat, exserted; filaments very short; anthers conniving, opening by 2 terminal pores. *Ovary* 2- rarely 3–4-celled; style simple, stigma obtuse; ovules many. *Berry* 2- rarely 4-celled, many seeded. *Seeds* reniform.—DISTRIB. An immense tropical genus, rarer in temp. regions; species probably 500–600.—ETYM. doubtful.

1. **S. Dulcama'ra,** *L.*; perennial, stem flexuous, leaves ovate or cordate sometimes 3-partite, cymes panicled leaf-opposed or lateral. *Bitter-sweet.* Hedges and copses from Isla and Ross southwards; a denizen in Scotland, *Watson*; rather rare in Ireland; fl. June–Aug.—Glabrous or pubescent. *Rootstock* extensively creeping. *Stem* 4–6 ft., trailing. *Leaves* 1–3 in., acuminate, cordate, or upper hastate or with 2 auricles or petioled pinnules at the base. *Flowers* many, drooping; pedicels slender. *Calyx-lobes* broad, obtuse. *Corolla* ½ in. diam., purple or white, lobes revolute. *Anthers* yellow, cohering in a cone. *Berry* ½ in., ovoid, mucronate, red.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India; introd. in N. America.

VAR. *marïtimum*, Syme; stem prostrate branched, leaves fleshy. S. coast.

2. **S. ni'grum,** *L.*; annual, stem erect angled usually tubercled, leaves rhomboid-ovate narrowed into the petiole, cymes umbellate lateral.

Waste places from Ayr and Fife southwards; not indigenous in Scotland or Ireland; fl. July–Oct.—Glabrous or pubescent. *Stem* 6–24 in., rarely more. *Leaves* 1–3 in., sinuate or toothed. *Flowers* few, drooping; pedicels slender. *Calyx-lobes* broad, obtuse. *Corolla* ¼–⅜ in. diam., white; lobes ciliate, recurved. *Berries* ½ in. diam., globose, black yellow or red.—DISTRIB. Widely dispersed in temp. and trop. regions.

VAR. 1, *ni'grum* proper; hairs usually curved upwards, leaves sinuate, berry black.—VAR. 2, *minia'tum*, Bernh. (sp.); hairs usually straight, leaves toothed, berry scarlet. Jersey and Guernsey.

3. AT'ROPA, *L.* DWALE.

A branched herb. *Leaves* scattered or in pairs, quite entire. *Flowers* solitary or few, peduncled, lurid violet or greenish. *Calyx* 5-partite. *Corolla* campanulate, regular; lobes 5, plaited. *Stamens* 5, inserted at the bottom of the corolla-tube, filaments filiform; anthers with slits. *Ovary* 2-celled; style simple, stigma peltate; ovules many. *Berry* 2-celled, subtended by the spreading calyx, many-seeded. *Seeds* reniform, minutely pitted.—DISTRIB. Europe from Denmark southwards, N. Africa; introd. in N. America.—ETYM. Ἄτροπος, one of the Fates.

1. **A. Belladon'na,** *L.*; leaves ovate acuminate. *Deadly Nightshade.*
Waste places, especially in chalk and limestone soils, oftenest near ruins, from Westmoreland southwards; also rare and near houses in Forfar, Argyle, and Ireland; fl. June–Aug.—Glabrous or pubescent and glandular. *Rootstock* stout, fleshy; stoloniferous. *Stem* 2–3 ft., stout. *Leaves* usually in unequal pairs, larger 3–8 in., contracted into the petiole. *Flowers* axillary supra-axillary and from the forks, drooping; peduncles ½–1 in., slender. *Calyx* ½–¾ in., lobes broadly ovate. *Corolla* 1 in., greenish-purple; lobes subequal, spreading, acute. *Filaments* subequal, tip incurved; anthers pale, included. *Berry* spheroidal, obscurely 2-lobed.

ORDER LII. PLANTAGINEÆ.

Annual or perennial scapigerous herbs. *Leaves* usually all radical with parallel ribs, rarely cauline and opposite or alternate. *Scapes* axillary. *Flowers* small, green, usually spiked, regular, bisexual (1-sexual in *Littorella*). *Sepals* 4, persistent, imbricate in bud. *Corolla* hypogynous, salver-shaped, scarious, tube slender; lobes 4, spreading, imbricate in bud. *Stamens* 4, inserted on the corolla-tube, alternate with its lobes (hypogynous in *Littorella*), filaments capillary, inflexed in bud, pendulous in flower, persistent; anthers large, versatile, deciduous. *Ovary* free, 2–4-celled (1-celled and 1-ovuled in *Littorella*); style filiform, with 2 lines of stigmatic glands; ovules solitary and basal, or many and attached by their faces to the septum. *Fruit* a 1–4-celled, 1- or more-seeded, membranous capsule, bursting transversely (bony and indehiscent in *Littorella*), seed-bearing septum with free margins. *Seeds* peltate, albumen fleshy; embryo cylindric parallel to the hilum, cotyledons oblong or linear, radicle inferior.—DISTRIB. All temp. regions; genera 3; species about 50.—AFFINITIES. Altogether doubtful.—PROPERTIES. Mucilaginous, unimportant.

Terrestrial. Flowers spiked, 2-sexual.....1. Plantago.
Aquatic. Flowers few, 1-sexual.....2. Littorella.

1. PLANTA'GO, *L.* PLANTAIN, RIB-GRASS.

Perennial or annual herbs. *Flowers* 2-sexual, in terminal spikes or heads. *Sepals* 4. *Stamens* 4, inserted on the corolla. *Ovary* 2–4-celled. *Capsule* dehiscing transversely. *Seeds* with a mucilaginous testa.—DISTRIB. of the Order; species about 48.—ETYM. the old Latin name.

1. **P. ma'jor,** *L.*; leaves petioled oblong or ovate-oblong toothed 3–7-ribbed, scape short not furrowed, spike very long, sepals free, capsule 2-celled 8–16-seeded, seeds flat in front.
Pastures and waste places, ascending to near 2,000 ft. in Northumberland; fl. May–Sept.—Glabrous or hairy. *Rootstock* stout, truncate. *Leaves* 2–5 in., petioles broad short, teeth very irregular. *Scape* about as long as the leaves; spike slender, longer than the scape; bracts equalling the calyx, oblong-ovate, concave, obtuse, glabrous. *Sepals* ⅛ in., obtusely keeled, margins scarious. *Corolla-tube* glabrous. *Filaments* short; anthers purple. *Seeds* black, rough.—DISTRIB. Europe, N. Africa, N. Asia, W. Asia to the Himalaya; introd. in N. America.—Seeds used for feeding cage-birds.

2. **P. me'dia,** *L.*; leaves subsessile elliptic-oblong toothed 5-9-ribbed, scape long not furrowed, spike short, sepals free, capsule 2-celled 2-seeded, seeds flat in front.

Roadsides and waste places, usually on a dry soil, ascending to 1,600 ft. in Northumberland; rare or introduced only in Scotland and Ireland; fl. June–Oct.—Pubescent with jointed hairs. *Rootstock* tapering. *Leaves* 6–10 in., very variable. *Scape* 6–12 in.; spike 1–3 in.; bracts often purple, concave, obtuse, edges silvery, shorter than the glabrous unkeeled sepals. *Corolla-tube* glabrous. *Filaments* long, purple; anthers whitish. *Seeds* brown, rough. —DISTRIB. Europe, N. Africa, Siberia, W. Asia to the Himalaya.

3. **P. lanceola'ta,** *L.*; leaves petioled lanceolate entire or toothed 3–6-ribbed, scape long deeply furrowed, spike short, 2 dorsal sepals often connate, capsule 2-celled 2-seeded, seeds concave in front.

Pastures and waste places, ascending to 2,200 ft. in the Highlands; fl. May–Oct.—Glabrous or pubescent. *Rootstock* tapering, crown woolly. *Leaves* 1–12 in., very variable. *Scape* as long; spike ½–3 in., ovoid globose or cylindric; bracts flat, acuminate. *Sepals* hairy at the tip, 2 dorsal keeled. *Corolla* longer than the calyx-tube, glabrous. *Stamens* long, all white. *Seeds* black, shining.—DISTRIB. Europe, N. Africa, N. and W. Asia to the Himalaya; introd. in N. America.—Leaves formerly employed for dressing sores in Scotland.

VAR. 1, *lanceola'ta* proper; bracts and sepals blackish at the tips.—VAR. 2, *Timba'li,* Jord. (sp.); bracts and sepals with broad silvery margins. Fields of clover, &c., not indigenous.

4. **P. marit'ima,** *L.*; leaves narrow linear fleshy faintly 3–5-ribbed, scape not furrowed, spike short or long, 2 dorsal sepals connate, capsule 2-celled 2-seeded, seeds flat in front.

Salt marshes and mountain streams, ascending to 1,800 ft. in the Highlands; fl. June–Sept.—Perennial, glabrous or hairy. *Rootstock* woody, branched, woolly at the crown. *Leaves* 1–12 in., ⅛–½ in. diam., very variable, sometimes narrowly lanceolate, quite entire or remotely toothed. *Scapes* as long as or longer than the leaves; spikes ¼–3 in.; bracts ovate-lanceolate. *Sepals* nearly glabrous, the 2 dorsal with a toothed keel, margins narrowly scarious. *Corolla-tube* pubescent. *Stamens* pale yellow. *Seeds* brown, faintly winged at one or both ends.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria, W. Asia to the Himalaya, N. America.

5. **P. Corono'pus,** *L.*; leaves narrow linear 1-ribbed toothed 1–2-pinnatifid, scape not furrowed, spike short or long, 2 dorsal sepals with a winged scarious keel, capsule 3–4-celled 3–4-seeded, seeds flat in front.

Sandy and gravelly places, most common near the sea; fl. June–Aug.—Annual or biennial, usually pubescent with long hairs. *Leaves* 1–12 in., very variable. *Scapes* usually ascending equalling or exceeding the leaves; spikes ¼–6 in.; bracts ovate, long acuminate, much exceeding the obtuse sepals. *Corolla-tube* pubescent. *Stamens* pale yellow. *Seeds* pale brown.—DISTRIB. Europe, N. Africa, W. Asia.

2. LITTORELLA, *L.* SHORE-WEED.

A creeping aquatic perennial herb. *Leaves* all radical, ½-cylindric. *Scapes* short, few-flowered; flowers monœcious. MALE fl. solitary. *Sepals* 4. *Corolla-tube* cylindric, lobes 4. *Stamens* 4, hypogynous. *Ovary* rudi-

mentary. FEMALE fl. usually 2 at the base of the male scape. *Sepals* 3–4, unequal. *Corolla* urceolate, mouth 3–4-toothed. *Stamens* 0. *Ovary* flagon-shaped, 1-celled; style very long, rigid; ovule 1 rarely 2, erect, campylotropous, flanked by a column of placental tissue. *Fruit* bony. *Seed* erect, testa membranous. — DISTRIB. Europe (Arctic) except Turkey, Azores.—ETYM. *littus*, from growing near *shores*.

1. **L. lacus'tris**, *L.*; leaves fleshy lacunose internally.

Sandy or gravelly edges of lakes and ponds; ascends to 1,600 ft. in the Highlands; fl. Aug.—Glabrous or puberulous, often forming a matted turf. *Rootstock* creeping, white, stoloniferous. *Leaves* 1–4 in., linear-subulate, sheathing at the base. MALE fl. *Scape* axillary, much shorter than the leaves, 1–2-bracteate below the middle, papillose. *Sepals* ¼ in. obtuse, green, edges scarious. *Stamens* long; anthers very large, pale. FEMALE fl. subsessile, enclosed in lanceolate bracts.

ORDER LIII. SCROPHULARI'NEÆ.

Herbs or shrubs (rarely trees). *Leaves*, lower opposite or whorled, upper alternate, rarely all opposite or alternate and stipulate. *Inflorescence* various, flowers usually irregular, peduncles 2-bracteate at the forks. *Calyx* inferior, usually persistent, 5-merous. *Corolla* hypogynous; lobes 4–5, imbricate or subvalvate in bud. *Stamens* 4, rarely 2 or 5, inserted on the corolla-tube, didynamous, with or without a rudimentary 5th; anthers 1- or 2-celled. *Disk* hypogynous, annular glandular or cup-shaped. *Ovary* 2-celled; style simple, stigma capitate or 2-lobed; ovules many, very rarely 2 in each cell, anatropous or amphitropous, placentas on the septum. *Fruit* a many-seeded capsule, rarely a berry, dehiscence various. *Seeds* small, testa various, hilum lateral or ventral, albumen fleshy; embryo straight, rarely curved, radicle next the hilum or lateral.—DISTRIB. All climates; genera 180; species about 1,800.—AFFINITIES. Many, nearest with *Orobancheæ*, and *Solaneæ*.—PROPERTIES. A few are purgative, or emetic, or intensely bitter or very poisonous.

SUB-ORDER I. **Antirrhi'nideæ.** *Corolla* with the posticous (upper) lobes external in bud.

TRIBE I. **VERBAS'CEÆ.** *Leaves* alternate. *Inflorescence* centripetal. *Corolla* rotate. *Stamens* 5, declinate, unequal.....1. Verbascum.

TRIBE II. **ANTIRRHI'NEÆ.** Lower leaves or all opposite or whorled. *Inflorescence* centripetal. *Corolla* personate, tube saccate or spurred. *Capsule* opening by pores.

Corolla spurred at the base.....2. Linaria.

Corolla saccate at the base.....3. Antirrhinum.

TRIBE III. **CHELO'NEÆ.** *Inflorescence* composite. *Corolla* not spurred or saccate. *Capsule* 2–4-valved.....4. Scrophularia.

TRIBE IV. **GRATI'OLEÆ.** *Inflorescence* centripetal. *Corolla* not spurred or saccate. *Capsule* 2-valved.....4*. *Mimulus*.

SUB-ORDER II. **Rhinan'thideæ.** *Corolla* with the posticous (upper) lobes never exterior in bud.

TRIBE V. **SIBTHORP'IEÆ.** *Flowers* axillary. *Leaves* alternate. *Corolla* short, subregular. *Stamens* 4, nearly equal.
Leaves fascicled, linear. Anthers 1-celled .....5. Limosella.
Leaves alternate, orbicular. Anthers sagittate, 2-celled.....6. Sibthorpia.

TRIBE VI. **DIGITA'LEÆ.** *Inflorescence* centripetal. *Leaves* alternate, lower petioled. *Stamens* 2 or 4; no rudiment of a 5th .....7. Digitalis.

TRIBE VII. **VERON'ICEÆ.** *Inflorescence* centripetal. *Leaves* opposite. *Corolla* almost regular. *Stamens* 2, diverging .....8. Veronica.

TRIBE VIII. **EUPHRA'SIEÆ.** *Inflorescence* centripetal. *Leaves* usually opposite. *Corolla* 2-lipped. *Stamens* 4, converging.
Leaves opposite. Seeds many, small, not winged.
Upper corolla-lip entire or notched.....9. Bartsia.
Upper corolla-lip with 2 spreading or reflexed lobes .....10. Euphrasia.
Leaves opposite. Seeds few, compressed, winged .....11. Rhinanthus.
Leaves alternate. Seeds many, small, not winged.....12. Pedicularis.
Leaves opposite. Seeds 1–2 in each cell, not winged....13. Melampyrum.

1. VERBAS'CUM, *L.* MULLEIN.

Tall, erect, usually biennial, tomentose or woolly herbs. *Leaves* alternate. *Flowers* fascicled in simple or compound racemes, red yellow or purple, rarely white. *Calyx* 5-partite. *Corolla* rotate; segments 5, nearly equal. *Stamens* 5, 3 posterior filaments bearded; anthers adnate, cells confluent. *Stigma* undivided or 2-lamellate. *Capsule* septicidally 2-valved, many-seeded. *Seeds* pitted.—DISTRIB. Chiefly Europe and W. Asia; species about 80.—ETYM. A corruption of *Barbascum*, the old Latin name.

The following hybrids occur; their names indicate their parentage: *Thapso-Lychnitis, Thapso-nigrum, nigro-pulverulentum, nigro-Lychnitis.*

1. **V. Thap'sus,** *L.*; densely woolly, eglandular, stem terete simple, leaves very decurrent, flowers in a dense simple woolly spike.

Waste dry places, local, from Arran and Forfar southwards, and in Ireland; often an escape; a denizen in Scotland, *Watson;* fl. June–Aug.—*Stem* 2–3 ft., stout. *Radical leaves* 6–18 in., obovate-lanceolate, entire or crenate; cauline oblong, acute, upper acuminate. *Spike* 6–10 in.; bracts longer than the flowers. *Corolla* ¾–1 in. diam., woolly externally. *Filaments* with white hairs; anthers of long stamens slightly decurrent. *Seeds* ribbed.—DISTRIB. Europe, Siberia, W. Asia, Himalaya; introd. in N. America.—Wool formerly used for lamp-wicks.

2. **V. Lychni'tis,** *L.*; stem angled, leaves stellately-pubescent, racemes panicled narrow, flowers small whitish, hairs of filaments white.

Waste places, from Suffolk, Stafford, and Denbigh southwards; an escape in Scotland; a native? *Watson;* fl. July–Aug.—*Stem* 2–3 ft. *Radical leaves* 4–10 in., petioled, oblong-lanceolate, obtuse, coarsely crenate, green above, white below; cauline sessile, ovate, acuminate. *Racemes* erect, many-flowered. *Flowers* ½ in. diam., several to each bract. *Calyx* small, very woolly. *Anthers* not decurrent. *Style* slender. *Capsule* small, ovoid.—DISTRIB. Europe from Denmark southwards, W. Asia; introd. in N. America.

3. **V. pulverulen'tum,** *Vill.*; mealy, stem terete, leaves stellately-pubescent, racemes panicled pyramidal, flowers yellow, hairs of filaments white.

Waste places in Norfolk and Suffolk, especially about Norwich; a native? *Watson;* fl. July.—Habit of *V. Lychnitis*, but leaves much broader, sessile, with small cronatures and more matted with woolly hairs; cauline cordate. *Flowers* ½–¾ in. diam., several to each bract, bright yellow. *Sepals* small, lanceolate. *Anthers* not decurrent. *Capsule* small, ovoid.—DISTRIB. Europe from Belgium southwards, excl. Greece and Russia.

4. **V. ni'grum,** *L.*; stem angular, leaves stellately pubescent, raceme nearly simple, flowers yellow, hairs of filaments purple.

Waste places, fields, &c. from Notts and Stafford southwards, but often an escape; fl. June–Oct.—*Stem* 2–3 ft., and whole plant covered with long hairs, not so matted as in the former species. *Radical leaves* sometimes 1 ft., ovate-oblong or oblong-lanceolate, often cordate, petioled, crenate; cauline, except the upper, petioled, ovate-cordate, hardly white below. *Raceme* 1–1½ ft., slender, erect. *Flowers* ½–¾ in. diam., many to each bract, pedicelled. *Anthers* not decurrent. *Sepals* small, lanceolate, tomentose. —DISTRIB. Europe, Siberia.

5. **V. Blatta'ria,** *L.*; nearly glabrous, stem subangular, panicle with slender branches glandular, flowers yellow, hairs of filaments purple.

Waste places, rare, from Norfolk and Stafford southwards, and in S. and W. of Ireland; probably always an escape; a denizen or alien, *Watson;* fl. June–Oct.—*Stem* 8 in. to 4 ft., rather slender, simple or branched. *Radical leaves* 4–10 in., oblong-lanceolate, obtuse, crenate lobulate or subpinnatifid; cauline small, sessile, ovate or oblong, acute or acuminate, sometimes cordate, irregularly toothed or subcrenate. *Flowers* ¾–1¼ in. diam., bright yellow, lax or dense; lower bracts leafy; peduncles ½–1 in. *Sepals* oblong, often large. *Anthers* of long stamens decurrent. *Capsule* nearly globose. —DISTRIB. Europe from Holland southwards, N. Africa, W. Asia to the Altai and Himalaya; introd. in N. America.

Sub-sp. BLATTA'RIA proper; upper leaves not decurrent, racemes lax-flowered, pedicels solitary slender longer (often much) than the calyx.—Native (*l*) of S.W. England, probably introd. elsewhere.

Sub-sp. VIRGA'TUM, *With.* (sp.); more glandular, upper leaves shortly decurrent, racemes dense-flowered, pedicels more fascicled shorter than the calyx.

2. LINA'RIA, *Tournef.* TOAD-FLAX.

Herbs, rarely shrubby. *Lower leaves* opposite whorled or alternate. *Flowers* in bracteate racemes or spikes, rarely axillary and solitary. *Calyx* 5-partite. *Corolla* personate, tube spurred; upper lip erect; lower with the mid-lobe smallest; palate sometimes closing the throat. *Stamens* 4 fertile, 5th 0 or rudimentary; anthers oblong. *Stigma* notched or 2-lobed. *Capsule* ovoid or globose; cells nearly equal, dehiscing by simple or toothed pores. *Seeds* angled or rugose, sometimes discoid and winged.—DISTRIB. Europe, W. Asia; species 100.—ETYM. *linum, flax,* which some sp. resemble.—*Flowers* sometimes regular (*Peloria*), with 5 spurs and lobes to the corolla and 5 stamens.

SECTION 1. **Cymbala'ria,** *Chav.* Trailing and creeping. *Peduncles* axillary, 1-flowered. *Spur* short; palate not projecting. *Capsule* dehiscing by small 3-fid valves.

L. CYMBALA'RIA, *Mill.*; glabrous, leaves petioled subsucculent broadly reniform irregularly 3–7-angled or -lobed. *Ivy-leaved Toad-flax.*

Old walls, from the Forth and Clyde southwards, and in Ireland; an alien, *Watson;* fl. May–Sept.—Perennial. *Branches* 6–24 in., slender. *Leaves* ½–¾ in. diam.; lobes acute. *Flowers* ½ in., blue-purple; peduncles slender. *Sepals* linear-lanceolate. *Palate* yellow, closing the throat. *Capsule* small, globose. *Seeds* wingless, testa wrinkled.—DISTRIB. Europe from Holland southwards, excl. Turkey.—Eaten as a salad in S. Europe.

SECTION 2. **Elatinoi'des,** *Chav.* Diffuse. *Peduncles* axillary, 1-flowered. *Spur* as long as the corolla; palate projecting. *Capsule* dehiscing by pores which are furnished with deciduous valves.

1. **L. spu'ria,** *Mill.*; hairy or villous and glandular, leaves shortly petioled ovate or orbicular entire or obtusely toothed. *Male Fluellin.*

Sandy and chalky cornfields, from Lincoln and Notts southwards; a colonist, *Watson;* fl. July–Oct.—Annual. *Stem* 4–18 in., erect; branches many, prostrate, slender. *Leaves* ½–1 in., opposite or alternate, rarely cordate, acute or apiculate. *Peduncles* longer than the leaves. *Sepals* oblong or ovate-cordate. *Corolla* ⅓ in., yellow, throat purplish above; spur at right angles to the tube. *Fifth stamen* a small scale. *Capsule* subglobose. *Seeds* with broad deep pits.—DISTRIB. Europe from Holland southwards (excl. Turkey), N. Africa, W. Asia; introd. in N. America.

2. **L. Elat'ine,** *Mill.*; hairy or villous and slightly glandular, leaves shortly petioled, cauline alternate broadly hastate acute.

Sandy and gravelly cornfields, from Anglesea and Yorkshire southwards; S. and W. of Ireland, rare; a native or colonist, *Watson;* fl. July–Oct.—Annual. *Branches* 6–30 in., many from a very short stem, prostrate, very slender. *Leaves,* radical and lower opposite, ovate; cauline ½–1 in., sometimes toothed towards the very acute basal lobes. *Peduncles* capillary, longer than the leaves, curved at the top. *Sepals* oblong-lanceolate. *Corolla* ¼–⅓ in., yellow; upper lip purple within. *Capsule* globose. *Seeds* much as in *L. spuria.*—DISTRIB. Europe from Denmark southwards, N. Africa to Abyssinia, W. Asia to the Himalaya; introd. in N. America.

SECTION 3. **Linarias'trum,** *Chav.* *Flowers* racemed. *Spur* long or short; palate prominent. *Capsule* 4–10-valved at the top.

3. **L. vulga'ris,** *Mill.*; perennial, erect, almost glabrous glaucous, leaves linear or lanceolate, sepals ovate or lanceolate shorter than the spur or capsule, corolla yellow.

Waste ground from Moray and Dumbarton southwards, rarer in Ireland; fl. July–Oct.—*Rootstock* creeping. *Stem* 1–2 ft., stout or slender, leafy. *Leaves* 1–3 in., often whorled. *Raceme* dense-flowered; pedicels variable; bracts linear. *Corolla* ¾–1 in.; spur short in a line with and as long as the tube, acute. *Capsule* broadly oblong. *Seeds* scabrous, winged.—DISTRIB. Europe (Arctic), excl. Turkey, Siberia, Dahuria; introd. in N. America.—A reputed purgative and diuretic.

VAR. 1, *vulga'ris* proper; leaves obscurely 3-nerved, raceme glandular-pubescent, sepals ovate-lanceolate.—VAR. 2, *latifo'lia,* Bab.; leaves 3-nerved, raceme glabrous, bracts foliaceous, sepals lanceolate, corolla 1½ in. *L. speciosa,* Bromf.—Isle of Wight and Kent.

4. **L. Pelisseria'na,** *Mill.*; annual, erect, glabrous, leaves linear, sepals subulate shorter than the slender spur longer than the capsule, corolla purple.

Near St. Ouen's Pond, Jersey; fl. June–July.—Small, 6–10 in., with short barren stolons at the base. *Leaves* on the stolons oblong, ¼–½ in., opposite and whorled in threes; cauline ¾ in., scattered, linear, obtuse. *Raceme* short, few-flowered; bracts longer than the pedicels. *Corolla* ⅜ in.; spur in a line with the tube, acute. *Capsule* broad, 2-lobed. *Seeds* flat, winged, tubercled on one face, wing fimbriate.—DISTRIB. Europe from Belgium southwards, W. Asia.

5. **L. re'pens,** *Ait.*; perennial, creeping, glabrous, sepals lanceolate as long as the spur shorter than the capsule, corolla violet. *L. striata,* DC.

Waste places, from Westmoreland, Oxford, and Gloucester southwards, rare; naturalized north of this and in Scotland; S. and E. of Ireland, very rare; fl. July–Sept.—*Rootstock* slender, creeping. *Stems* 1–3 ft., many, very slender, branched, leafy. *Leaves* ⅝–1½ in., whorled or scattered, narrowly linear-lanceolate. *Racemes* elongating; bracts very small. *Corolla* ½ in.; spur almost in a line with the tube, obtuse. *Capsule* broad, compressed. *Seeds* angled, wrinkled transversely.—DISTRIB. Europe, excl. Turkey and Greece.—A hybrid (*L. sepium,* Allman.) occurs between this and *L. vulgaris.*

SECTION 4. **Chænorrhi'num,** *DC. Flowers* axillary or racemed. *Spur* short; palate depressed; upper lip horizontal.

6. **L. mi'nor,** *Desf.*; leaves alternate linear or oblong-lanceolate.

Cornfields in chalky and sandy soils, from Lanark and Roxburgh southwards, but local; S. and E. of Ireland, very rare; a colonist, *Watson;* fl. May–Oct.—Annual, glandular-pubescent. *Stem* 6–18 in., slender; branches ascending. *Leaves* ¼–1 in. *Peduncles* axillary, longer than the leaves. *Sepals* linear-oblong. *Corolla* scarcely exceeding the calyx, ¼ in., pale purple; lower lip whitish; palate yellow; spur short. *Capsule* gibbous at the base, cells subequal, opening by ragged pores. *Seeds* truncate, furrowed.—DISTRIB. Europe (excl. Turkey), N. Africa.

3. ANTIRRHI'NUM, *Tournèf.* SNAPDRAGON.

Annual or perennial herbs. *Leaves* entire, rarely lobed, lower opposite, upper alternate. *Flowers* solitary and axillary, or racemose and bracteate. *Calyx* 5-partite. *Corolla* personate, tube saccate, compressed; upper lip erect; lower spreading, mid-lobe smallest; palate broad, bearded, closing the throat. *Stamens* 4 fertile, 5th rudimentary or 0; anther-cells oblong. *Stigma* shortly 2-lobed. *Capsule* 2-celled, upper cell bursting by one pore, lower by 2 many-toothed pores, rarely globose with 1 pore to each cell. *Seeds* minute, oblong, truncate, rugose or pitted.—DISTRIB. Europe, W. Asia; species 11.—ETYM. *ἀντί* and *ῥὶν,* from the *snout*-like flower.

1. **A. Oron'tium,** *L.*; low, annual or biennial, leaves linear-lanceolate, raceme leafy or flowers axillary, sepals longer than the corolla.

Cornfields, from Norfolk and Anglesea southwards; very rare in Ireland; a colonist, *Watson;* fl. July–Oct.—Glabrous below, usually glandular-pubescent above. *Stem* 6–18 in., much branched from the base. *Leaves* 1–2 in., sessile, sometimes ciliate. *Bracts* leafy; pedicels short, erect. *Sepals* ½–1 in., very narrow, spreading. *Corolla* ½–⅝ in., rose-purple. *Capsule* ½ in., pubescent. *Seeds* compressed, concave on one face, 1-ribbed on the other, margin thickened.—DISTRIB. Europe from Denmark southwards, N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America.

A. MA'JUS, *L.*; tall, perennial, leaves lanceolate-oblong or linear, raceme bracteate glandular-pubescent, sepals short.

Old walls; an alien, *Watson;* fl. July–Sept.—Erect, branched, shrubby and glabrous below, above glandular-pubescent. *Leaves* 1–3 in., very variable. *Racemes* dense-flowered; bracts ovate, acuminate; pedicels erect. *Sepals* unequal, very obtuse. *Corolla* 1½ in., purple white yellow or crimson; palate yellow. *Capsule* ½ in., glandular. *Seeds* ribbed and muricate.—DISTRIB. Europe from Holland southwards; introd. in N. America.—Seeds yield oil in Russia. Leaves, &c. bitter and stimulant.

4. SCROPHULA'RIA, *Tournef.* FIG-WORT.

Herbs, often fœtid. *Leaves* opposite, or the upper alternate, entire or divided, often with pellucid dots. *Flowers* in panicled thyrsoid cymes, greenish-purple or yellow; peduncles glandular-pubescent. *Calyx* 5-partite. *Corolla-tube* oblong or ventricose; lobes short, 4 upper erect, lowest spreading. *Stamens* 4, 5th usually rudimentary, declinate; anther-cells adnate to the filaments, confluent, bursting transversely. *Disk* oblique. *Stigma* notched. *Capsule* acute, septicidally 2-valved; valves entire or 2-fid. *Seeds* ovoid, rugose.—DISTRIB. Europe, temp. Asia, N. Africa, rare in America; species about 80.—ETYM. In reference to its former use in *Scrofula.*

SECTION 1. **Scrophula'ria** proper. *Sepals* obtuse. *Corolla* purplish, throat not contracted, upper lobes longer than the lateral. *Stamens* 4, included, 5th reduced to a scale on the upper lip.

1. **S. nodo'sa,** *L.*; glabrous below, stem acutely 4-angled, leaves ovate or triangular-cordate acutely doubly-serrate, border of sepals narrow.

Shady places, from Ross and Harris southwards, ascending to 1,500 ft. in Yorkshire; fl. July–Oct.—*Rootstock* tuberous, nodose. *Stem* 1–3 ft., simple. *Leaves* 2–4 in., shortly petioled, acute or acuminate, nerves strong, teeth largest near the base. *Cymes* lax; bracts linear acute, lower leafy; pedicels erect, slender, glandular at the base. *Flowers* ⅓ in., green or brownish; scale of upper lip notched. *Capsule* broadly ovoid, acuminate. *Seeds* rugose, brown.—DISTRIB. Europe, Siberia, W. Asia, N. America.

Sub-sp. ALA'TA, *Gilib.* (sp.); laxer, upper part of stem broadly winged, bracts foliaceous. *S. umbrosa,* Dumort; *S. Ehrharti,* Stev.

2. **S. aquat'ica,** *L.*; glabrous below, stem 4-winged, leaves oblong-lanceolate obtuse or acute doubly crenate-toothed, petiole winged, border of sepals broad. *S. Balbisii,* Hornem.

Ditches and edges of ponds, &c. from the Clyde and Berwick southwards; local in Ireland; fl. July–Sept.—*Rootstock* stout, creeping. *Stems* 2–4 ft., petioles winged and lobed or leaves pinnatisect below. *Leaves* 3–8 in., lower cordate at the base, glabrous or pubescent, teeth largest upwards. *Panicles* large, erect; cymes opposite, dichotomously branched, densely many-flowered; lower bracts small, linear. *Corolla* ¼–½ in., greenish below, brown above; upper lip 2-fid with a broad entire scale. *Capsule* small, ovoid, acuminate.—DISTRIB. Europe from Denmark southwards, N. Africa, Siberia, W. Asia to the Himalaya.

3. **S. Scorodo'nia,** *L.*; glandular-pubescent, stem obscurely 4-angled, leaves ovate or triangular-ovate doubly crenate, petiole not winged, border of sepals broad.

Shaded places, Cornwall, Devon, Jersey, Guernsey; fl. July–Aug.—*Rootstock* creeping. *Stem* 2–4 ft., simple. *Leaves* 1½–4 in., coarsely crenate-serrate, usually deeply cordate, much wrinkled. *Cymes* corymbose, in long lax panicles; bracts leafy; pedicels slender. *Corolla* ½ in., dull purple; upper lip 2-partite; scale broad, entire or notched. *Capsule* subglobose or ovoid, acuminate.—DISTRIB. Belgium, W. France, S. Europe, N. Africa.

SECTION 2. **Ceraman'thæ,** *Reich.* *Sepals* linear-oblong, subacute. *Corolla* yellow, throat contracted; lobes nearly equal. *Stamens* 4, exserted, 5th absent.

S. VERNA'LIS, *L.*; glandular-hairy, stem obscurely 4-angled, leaves broadly ovate or deltoid, petioles not winged, sepals not bordered.

Waste places, very local; absent from Ireland; a denizen, *Watson;* fl. April–June.—Pale green, flaccid. *Rootstock* creeping. *Stems* 1½–4 ft. *Leaves* 2–3 in., deeply doubly-crenate or lobulate. *Cymes* subumbellate, on axillary peduncles arranged in a terminal leafy panicle; pedicels short or slender; bracts and bracteoles leafy. *Corolla* urceolate. *Capsule* broadly ovoid, acuminate.—DISTRIB. Europe, excl. Spain Greece and Turkey.

4*. *MIM'ULUS, L.*

Erect or decumbent herbs. *Leaves* opposite. *Flowers* solitary, axillary. *Calyx* tubular, 5-angled, 5-toothed. *Corolla* 2-lipped; upper lip erect or reflexed, 2-lobed; lower spreading, 3-lobed; throat usually with 2 swellings; lobes flat, rounded. *Stamens* 4; anther-cells subconfluent. *Stigma* with 2 equal lamellæ. *Capsule* loculicidally 2-valved, valves separating from a seed-bearing column, many-seeded. *Seeds* minute, oblong.—DISTRIB. American, a few Australian and New Zealand; species 30.—ETYM. *μιμώ*, an *ape*, from the form of the corolla.

M. LU'TEUS, *L.*; suberect, leaves ovate-oblong coarsely toothed.

River-sides, &c., ascending to 1,000 ft., from Skye southwards, and in Ireland; naturalized from N. America; fl. July–Sept.—Glabrous or glandular-pubescent. *Stems* ½–3 ft., with many prostrate barren shoots, stout, hollow, terete. *Leaves* ½–3½ in., 6–9-nerved; lower petioled with often a few lobes on the petiole; upper sessile. *Flowers* 1–2 in., yellow; peduncles slender, exceeding the leaves. *Calyx-teeth* short, upper longest. *Capsule* enclosed in the inflated calyx, ovoid, compressed.—DISTRIB. N. America.

5. LIMOSEL'LA, *L.* MUDWORT.

Very small, tufted, creeping, glabrous, annual, aquatic herbs. *Leaves* narrow, fascicled at the nodes, rarely alternate, petiole dilated at the base. *Flowers* minute, ebracteate, axillary, solitary. *Calyx* campanulate, 5-toothed. *Corolla* subcampanulate, tube short, limb 5-fid. *Stamens* 4; anther-cells confluent. *Style* short, stigma clavate. *Capsule* septicidally 2-valved, valves entire, septum incomplete. *Seeds* grooved and transversely rugose.—DISTRIB. All temp. and cold latitudes.—ETYM. *limus, mud.*

1. **L. aquat'ica,** *L.*; leaves narrow-oblong-lanceolate or spathulate.

Edges of ponds from Kincardine southwards, but very rare in Scotland; unknown in Ireland; fl. July–Sept.—*Rootstock* filiform. *Leaves* 1–2 in., tufted. *Petiole* long. *Peduncles* shorter than the leaves, recurved in fruit. *Corolla* ⅛ in., pink or white. *Capsule* globose.

6. SIBTHOR'PIA, *L.*

Slender, creeping, hairy herbs. *Leaves* petioled, alternate or fascicled, reniform, lobulate. *Flowers* yellow or pink, very small, axillary, solitary, ebracteate. *Calyx* 4–8-fid. *Corolla* subrotate, 5–8-fid. *Stamens* as many as the corolla-lobes or one fewer; anthers sagittate, cells contiguous at the top, not confluent. *Stigma* capitate. *Capsule* membranous, compressed, loculicidally 2-valved. *Seeds* dorsally convex, flat or concave on the ventral face, hilum ventral.—DISTRIB. Europe, N. and W. trop. Africa, Andes; species 4 or 5.—ETYM. *Dr. H. Sibthorp*, an Oxford Professor of botany.

1. **S. europæ'a,** *L.*; leaves 7–9-lobed, pedicels short.

Moist shady banks, very rare; S. Wales, and from Sussex (formerly) to Cornwall, Channel and Scilly Is.; Kerry in Ireland; fl. July–Oct.—*Hairs* flaccid, jointed. *Stem* 6–14 in., filiform, creeping. *Leaves* ¼–¾ in. diam., membranous; lobes broad, rounded or retuse. *Flowers* minute; peduncle short. *Calyx-lobes* lanceolate. *Corolla* pink, two smaller lobes yellowish. *Capsule* very small.—DISTRIB. W. France, Spain, Greece, Turkey, Azores.

7. DIGITA'LIS, *L.* FOXGLOVE.

Tall, biennial or perennial herbs, rarely shrubs. *Lower leaves* crowded, petioled; upper alternate. *Flowers* in a long terminal raceme, purple orange yellow or white, spotted inside; throat bearded. *Calyx* 5-partite. *Corolla* declinate, tube campanulate or ventricose, constricted above the base; upper lobe short, spreading, notched or 2-fid; lower longer, horizontal. *Stamens* 4, ascending; anthers in pairs, cells diverging confluent. *Stigma* 2-lobed. *Capsule* septicidally 2-valved, valves entire with inflexed margins, separating from the seed-bearing column. *Seeds* minute, oblong, angled.—DISTRIB. Europe, N. Africa, W. Asia; species 18.—ETYM. *digitus*, a *finger*.

1. **D. purpu'rea,** *L.*; leaves ovate-oblong or lanceolate crenate.

Copses, banks, &c., ascends to near 2,000 ft. in the Highlands; fl. July–Sept.—Glandular-pubescent and hoary. *Stems* 2–4 ft., stout, erect, rarely branched. *Leaves* 6–12 in., rugose above, radical petioled; upper cauline sessile. *Raceme* 1–2 ft., elongate, secund, dense-flowered; bracts leafy; pedicels short, 1-flowered. *Flowers* pendulous. *Calyx-lobes* oblong-lanceolate. *Corolla* 1½–2½ in., purple spots, speckled with ocellated rarely white; lobes ciliate. *Capsule* ovoid, exceeding the calyx. *Seeds* alveolate.—DISTRIB. Europe, excl. Greece and Turkey.—A well-known drug.

8. VERON'ICA, *L.* SPEEDWELL.

Herbs or shrubs. *Leaves* lower or all opposite, rarely whorled. *Flowers* in axillary or terminal racemes, rarely solitary, usually blue, never yellow. *Calyx* 4–5-partite. *Corolla* rotate or subcampanulate; limb 4-fid, spreading, lateral lobes usually narrower. *Stamens* 2, inserted on the corolla-tube at the sides of the upper lobe, exserted; anther-cells diverging, or parallel and confluent at their tips. *Stigma* subcapitate. *Capsule* compressed or turgid, septi- or loculicidal. *Seeds* ovoid or orbicular, peltate, smooth or rugulose.—DISTRIB. North temp. regions, Australia, New Zealand; species about 160.—ETYM. obscure.

SECTION 1. **Omphalo'spora.** Annual. *Peduncles* 1-flowered, solitary, axillary in alternate leaf-like bracts. *Seeds* cup-shaped.

1. **V. agres'tis,** *L.*; prostrate, slightly hairy and glandular, leaves petioled ovate-cordate coarsely serrate, sepals ovate or oblong, capsule suborbicular deeply 2-lobed, cells 4–10-seeded.

Waste places, ascending to 1,200 ft. in Northumberland; fl. April–Sept.—*Branches* 4–8 in., slender. *Leaves* ½–¾ in., obtuse; floral similar, about as long as the decurved pedicels. *Sepals* ¼ in., ciliate, 3-nerved, ½ in. when in fruit, unequal. *Corolla* ⅛–¼ in. diam., shorter or longer than the sepals. *Capsule* ¼ in. diam.—DISTRIB. Europe, N. Africa, W. Asia to the Altai and the Himalaya; introd. in N. America.

Sub-sp. AGRES'TIS proper; leaves ½–¾ in., serratures regular not deep, sepals linear-oblong, corolla pale-blue or white, seeds 4–5 in each cell.

Sub-sp. POLI'TA, *Fries* (sp.); leaves ¼–½ in. broader, serratures deeper and rather irregular, sepals ovate subacute, corolla bright blue, seeds 8–10 in each cell.

V. BUXBAU'MII, *Ten.*; prostrate, hairy, eglandular, leaves shortly petioled oblong or ovate-cordate coarsely serrate, sepals lanceolate subacute spreading in fruit, lobes of the capsule diverging, cells 5–8-seeded.

Fields from Moray southwards, ascending to 1,000 ft. in Northumberland; also in Ireland; an alien becoming a colonist, *Watson;* fl. April–Sept.—*Branches* 6–12 in., tips often ascending. *Leaves* ½–1½ in., obtuse, petioles variable; floral similar, shorter than the decurved pedicels. *Sepals* usually large, ciliate, 5–7-ribbed and reticulate in fruit. *Corolla* ¼ in. diam., bright blue. *Capsule* ½ in. diam., reticulate and glandular-pubescent.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia to the Himalaya; introd. in N. America.

2. **V. hederæfo'lia,** *L.*; prostrate, pubescent, leaves petioled very broadly-ovate 5–7-lobed, sepals cordate ciliate exceeding the corolla, cells of the didymous capsule 1–2-seeded.

Cultivated ground; fl. March–Aug.—*Branches* 6–18 in. *Leaves* ½–¾ in. broad, petioles dilated upwards, lobes rounded obtuse; floral similar, about equalling the decurved or straight peduncles. *Flowers* appearing in succession as the branch lengthens. *Sepals* acuminate, membranous. *Corolla* ⅛ in. diam., pale blue. *Seeds* large, rugose, with a small deep pit on the inner face.—DISTRIB. Europe, N. Africa, W. Asia; introd. in N. America.

3. **V. triphyl'los,** *L.*; suberect, glandular-pubescent, leaves small, upper incised, lower petioled, sepals linear-oblong, cells of the obcordate capsule many-seeded.

Sandy fields, Norfolk and Suffolk, also York and Doncaster; fl. May–June.—*Stem* 3–8 in., rigid, branches few. *Leaves* ¼–½ in. long and broad, palmately 3–7-lobed; lobes entire, obtuse, oblong or linear; floral subdigitate. *Flowers* few, subracemose; bracts 3–5-partite; peduncles slender, ascending. *Sepals* subequal, obtuse. *Corolla* ¼ in. diam., dark blue. *Capsule* ¼ in. diam., as broad as long, deeply-lobed, glandular. *Seeds* rugose.—DISTRIB. Europe from Gothland southwards, N. Africa, W. Siberia, W. Asia to N.W. India.

SECTION 2. **Veronicas'trum.** *Leaves* all opposite, or floral alternate. *Flowers* in terminal racemes. *Capsule* flat, valves adhering to the axis. *Seeds* plano-convex, turgid or compressed.

4. **V. arven'sis,** *L.*; annual, erect or ascending, pubescent, leaves ovate-cordate irregularly crenate-serrate, bracts alternate, pedicels short, capsule obcordate, seeds 6–7 in each cell nearly flat.

Dry sandy, &c. places, ascends to near 2,000 ft. in Yorkshire; fl. May–Oct.—*Branches* 4–18 in., stiff, 2-fariously pubescent, often very long and simple. *Leaves* ½–¾ in., mostly sessile, lower petioled, serratures few obtuse. *Bracts* alternate, often very crowded in dense leafy cylindric racemes, linear or oblong-lanceolate, obtuse, entire or obscurely lobed, exceeding the flowers. *Sepals* narrow, obtuse, ciliate. *Corolla* minute, pale blue with a white eye. *Style* very short. *Capsule* ⅛–¼ in. broad, glandular, shorter than the sepals. —DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in N. America.

5. **V. ver'na,** *L.*; annual, erect, glandular-pubescent, leaves lobed or pinnatifid, bracts lanceolate entire, pedicels short, capsule deeply obcordate, seeds 6–7 in each cell flat.

Sandy fields in Norfolk and Suffolk; fl. May–June.—Habit of *V. arven'sis*, but always small, 2–4 in., densely leafy and more glandular-pubescent; flowers always much crowded; capsule and seeds much the same in both.—DISTRIB. Europe, Siberia, W. Asia to N. W. India.

6. **V. serpyllifo'lia,** *L.*; perennial, ascending, stem glandular-pubescent, leaves subentire, racemes many-flowered, pedicels short erect, style as long as the didymous flat capsule, seeds plano-convex minute.

Fields, moist waste places, &c., ascends to 2,500 ft. in the Highlands; fl. May–June.—Much branched from the base; branches 3–10 in. *Leaves* ½–¾ in., sessile, ovate-rotundate or oblong, obtuse, rather coriaceous. *Racemes* 1–4 in.; bracts alternate, quite entire, lower leaf-like, upper narrow. *Sepals* oblong-obovate, obtuse, ciliate, shorter than the corolla. *Corolla* ¼ in. diam., white or lilac. *Capsule* shorter than the sepals, glabrous.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, W. Asia to the Himalaya, N. America.

VAR. *humifu'sa*, Dicks. (sp.); decumbent, rooting at the nodes, leaves entire, flowers few, corolla blue, capsule glandular-pubescent. Alps of Scotland, Denbigh? and Northumberland? ascending to 3,700 ft. in the Highlands.

7. **V. alpi'na,** *L.*; perennial, erect, glandular-pubescent above, leaves ovate entire or serrulate, raceme corymbose few-flowered, bracts alternate, pedicels short erect, capsule obovate notched, seeds plano-convex.

Springs and rills on the high Scotch Alps, rare, from 2,000 to 3,700 ft.; fl. July–Aug.—Resembles *V. serpyllifo'lia*, but more erect; leaves rather larger; flowers fewer, in a denser raceme; sepals narrower, subacute, half as long as the obscurely notched capsule; corolla dark blue; style short, and seeds larger.—DISTRIB. Arctic, N. and Alpine Europe, Asia, and America.

8. **V. saxat'ilis,** *L.*; perennial, decumbent, subglabrous, lower leaves obovate, upper oblong, raceme subcorymbose few-flowered, bracts subopposite, pedicels long erect, style long, capsule oblong, seeds nearly flat.

High Scotch Alps of Clova, Braedalbane, Ben More and Ben Cruachan,

alt. 2,000–3,000 ft., rare ; fl. July–Sept.—*Stem* woody ; branches many 2–4 in., ascending, with leafy barren shoots. *Leaves* ¼–½ in., coriaceous, teeth very few or 0. *Pedicels* stiff, ½–½ in. *Sepals* linear-oblong, obtuse, shorter than the capsule. *Flowers* ⅓ in. diam., bright blue, very beautiful. *Style* short, slender. *Capsule* ¼ in., exceeding the sepals.—DISTRIB. Arctic, N. and Alpine Europe, Greenland.

SECTION 3. **Chamæ'drys.** Perennial. *Branches* diffuse, ascending. *Leaves* all opposite. *Racemes* axillary. *Capsule* flat, notched or 2-lobed, valves adhering to the axis. *Seeds* plano-convex or turgid.

9. **V. officina'lis,** *L.*; glandular-pubescent or subglabrous, stem hairy all round, leaves shortly petioled obovate-oblong or orbicular serrate, pedicels very short, capsule triangular or obcordate truncate or retuse.

Banks and pastures, especially in hilly regions; ascends to near 3,000 ft. in the Highlands ; fl. May–July.—Decumbent ; branches 2–18 in., ascending. *Leaves* ¼–1 in., contracted into the petiole, sharply or obtusely serrate. *Racemes* slender, many-flowered ; peduncles erect ; bracts lanceolate or subspathulate, obtuse. *Sepals* linear-oblong. *Corolla* ⅛ in. diam., pale blue or lilac. *Style* very long. *Capsule* ⅛ in., much longer than the sepals. *Seeds* nearly flat.—DISTRIB. Europe, Siberia, W. Asia to the Himalaya; N. U. States.—Leaves bitter and astringent.

VAR. *hirsu'ta,* Hopkirk (sp.); stem 1–3 in. very hairy, leaves narrower smaller, capsule seedless entire at the tip. Ayrshire. I have seen no fruit.

10. **V. Chamæ'drys,** *L.* ; hairy, stem pubescent on opposite sides, leaves subsessile ovate-cordate deeply serrate, pedicels slender, raceme long lax, capsule obcordate shorter than the calyx.

Copses, pastures, banks, &c.; ascends to 2,700 ft. in the Highlands; fl. May–June.—*Branches* 8–24 in., slender, ascending. *Leaves* ½–1½ in. *Raceme* with its slender peduncle 2–5 in. ; bracts linear, much shorter than the pedicels. *Sepals* linear-lanceolate, acute. *Corolla* ⅓–½ in. diam., bright blue. *Style* capillary. *Capsule* broader than long, pubescent and ciliate.—DISTRIB. Europe (Arctic), Siberia ; introd. in N. America.

11. **V. monta'na,** *L.*; hairy, stem pubescent all round, leaves petioled ovate-cordate serrate, pedicels slender, racemes short lax, capsule orbicular longer than the calyx glabrous, margin subcrenulate ciliate.

Moist woods from Skye and Moray southwards ; ascending to 1,000 ft. in Yorkshire ; rather rare in Scotland and Ireland ; fl. June–Sept.—Habit of *V. Chamædrys,* but sepals much broader ; corolla not ¼ in. diam., paler blue ; capsule glabrous except the ciliate margins ; and the foliage turns darker (though not black) in drying.—DISTRIB. Europe from Gothland southwards (excl. Greece and Turkey), N. Africa, W. Siberia.

12. **V. scutella'ta,** *L.* ; suberect, leaves sessile linear-lanceolate faintly toothed, racemes subopposite peduncled, pedicels slender deflexed in fruit.

Bogs, edges of ditches, &c., not very common ; ascends to 2,200 ft. in Yorkshire ; fl. July–Aug.—Glabrous, rarely hairy (var. *pubescens*). *Stem* 6–24 in., slender, brittle, decumbent and rooting below, sparingly branched, stoloniferous. *Leaves* 1–2 in., ½-amplexicaul. *Racemes* many, secund ; peduncles filiform, usually as long as the leaves ; pedicels spreading ; bracts small.

Sepals ovate-oblong, acute. *Corolla* ¼ in. diam., white or pinkish. *Capsule* ⅛ in. diam., broader than long, deeply 2-lobed, margins ciliate.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia, N. America.

SECTION 4. **Beccabun'ga.** Perennial. *Leaves* opposite, serrate. *Racemes* axillary, opposite, many-flowered. *Capsule* flat, loculicidal; valves 2-fid, falling away from the seed-bearing axis.

13. **V. Beccabun'ga,** *L.*; procumbent, glabrous, succulent, leaves petioled oblong obtuse serrate, capsule orbicular notched. *Brooklime.*

Margins of brooks, ditches, &c.; ascends to near 2,800 ft. in the E. Highlands; fl. May–Sept.—*Stem* hollow, rooting below; branches 1–2 ft., spreading. *Leaves* 1–2 in., sometimes obovate. *Racemes* 2–4 in.; bracts narrow, usually shorter than the pedicels. *Sepals* small, ovate-oblong, subacute, glabrous. *Corolla* ¼ in. diam., bright blue or pink. *Style* moderate. *Capsule* turgid, a little exceeding the sepals. *Seeds* minute, plano-convex.—DISTRIB. Europe, N. Africa, N. Asia, W. Asia to the Himalaya, N. Africa to Abyssinia.—A reputed antiscorbutic.

14. **V. Anagal'lis,** *L.*; erect, glabrous, stout, succulent, leaves sessile ½-amplexicaul ovate- or oblong-lanceolate serrate, capsule orbicular notched.

Watery places, rarer in the north; fl. July–Aug.—*Stem* 1–3 ft., simple or sparingly branched. *Leaves* 2–5 in., subacute, sometimes auricled at the base, teeth small. *Racemes* ascending, 4–10 in., elongating in fruit; bracts lanceolate, about equalling the pedicels. *Sepals* ovate-lanceolate, subacute, glabrous or glandular. *Corolla* ⅛–¼ in. diam., pale lilac or white. *Style* moderate. *Capsule* shorter than sepals, rather turgid. *Seeds* as in *V. Beccabunga.*—DISTRIB. Europe, N. Africa, Siberia, Dahuria, W. Asia to the Himalaya, N. America.

SECTION 5. **Pseudo-Lysima'chia.** Perennial. *Leaves* opposite or whorled. *Raceme* terminal. *Corolla-tube* cylindric. *Capsule* slightly compressed; valves adhering to the axis. *Seeds* plano-convex.

15. **V. spica'ta,** *L.*; pubescent, leaves oblong, spike dense.

Chalky pastures in Cambridge and Suffolk, and limestone rocks in the W. of England and Wales; fl. July–Aug.—*Rootstock* creeping. *Stem* 6–18 in., stout, erect from a decumbent base, leafy. *Leaves* 1–1½ in., coriaceous, sessile or petioled; lower ovate, obtuse, narrowed below, crenate-serrate. *Spike* 1½–3 in.; bracts ovate-lanceolate, exceeding the obtuse ciliate sepals. *Corolla* ¼ in. diam., bright blue, tube as long as broad, throat bearded; lobes narrow, acute. *Stamens* very long; anthers large, purple. *Style* long. *Capsule* equalling the sepals, ovoid, pubescent.—DISTRIB. Europe, Siberia.

VAR. 1, *spica'ta* proper; leaves subsessile narrow-oblong or oblong-lanceolate serrated above the middle. Eastern counties.—VAR. 2, *hyb'rida,* L. (sp.); larger, stouter, leaves petioled broader, serrate throughout. Western counties from Westmoreland to Bristol.

9. BART'SIA, *L.*

Erect herbs, parasitic on roots. *Leaves* opposite or upper alternate, crenate or serrate. *Flowers* in bracteate spikes; bracts leafy. *Calyx* tubular or campanulate, 4-fid. *Corolla* tubular, 2-lipped; upper lip arched, entire or notched, its sides not reflexed; lower as long or shorter, 3-fid at the tip. *Stamens* 4, didynamous, hidden by the upper lip; anther-

cells mucronate. *Stigma* obtuse, sometimes 2-lobed, posticous lobe very small. *Capsule* ovoid or oblong, compressed, loculicidally 2-valved, septa and placentas attached to the valves. *Seeds* transversely ovoid.—DISTRIB. N. temp. regions of the Old World; species about 30.—ETYM. *John Bartsch*, a Prussian botanist.

SUB-GEN. 1. **Bart'sia** proper. *Capsule* ovoid, acuminate. *Seeds* many, large, ribbed or winged on the back; hilum lateral.

1. **B. alpi'na,** *L.*; perennial, glandular-pubescent, leaves sessile ovate obtusely serrate, upper cordate amplexicaul.

Subalpine meadows and wet banks, Teesdale; Craven, and Orton in Westmoreland; Braedalbane and Mts. of Inverness and Ross; ascends to near 3,000 ft. in Scotland, absent from Ireland; fl. June–Aug.—Black when dry. *Rootstock* woody. *Stem* 4–8 in., erect, simple, terete, leafy. *Leaves* ½–¾ in., rather coriaceous, obtuse. *Spike* short, few-flowered; bracts purplish. *Calyx-lobes* ovate-lanceolate. *Corolla* ½–¾ in., dull blue-purple, glandular, lips small. *Anthers* exserted, bearded with white hairs. *Capsule* longer than the sepals. —DISTRIB. Europe (Arctic) from Gothland northwards, alps of France Germany and Italy, Greenland, Labrador.

SUB-GEN. 2. **Eufra'gia,** *Grisch.* (gen.). *Capsule* oblong, acute. *Seeds* very minute, faintly granulate; hilum basal.

2. **B. visco'sa,** *L.*; annual, viscid, leaves sessile ovate or oblong-lanceolate coarsely serrate.

Meadows, &c., S. and W. of England, from Sussex to Cornwall, and northwards to Argyle; S.W. of Ireland, local; Channel Is.; fl. June–Oct.—*Stem* 6–18 in., terete, usually simple, often flowering throughout much of its length. *Leaves* ½–1½ in., rather scabrid, nerves prominent beneath. *Calyx-tube* curved; lobes triangular lanceolate, acuminate. *Corolla* ¾ in., yellow, glandular; lower lip large. *Anthers* yellow, slightly bearded. *Capsule* pubescent, shorter than the calyx.—DISTRIB. W. Europe from Spain to Switzerland and Lombardy, N. Africa, the Caucasus, Caspian.

SUB-GEN. 3. **Odonti'tes,** *Persoon* (gen.). *Capsule* ovate or oblong, compressed, obtuse. *Seeds* strongly ribbed, pendulous; hilum basal.

3. **B. Odonti'tes,** *Huds.*; annual, pubescent, leaves linear-lanceolate distantly serrate. *Euphrasia Odontites*, L.

Fields and waste places; ascends to 1,200 ft. in the Highlands; fl. June–Aug.—*Stem* 6–18 in., erect or ascending, wiry, 4-gonous, paniculately branched; branches opposite, terminating in slender leafy racemes. *Leaves* ½–2 in., sessile, very variable. *Spikes* subsecund; lower bracts leafy, upper narrower. *Calyx* campanulate; lobes ovate, acute, as long as the tube. *Corolla* ½ in., pink, pubescent; upper lip long, entire; lower 3-lobed. *Anthers* usually exserted, yellow, almost glabrous. *Style* moderate. *Capsule* ¼ in., rather exceeding the calyx. *Seeds* narrow-oblong.—DISTRIB. Europe, N. Africa, Siberia, Dahuria.—Often placed in *Euphrasia*, and with reason.

VAR. 1, *ver'na*, Reich. (sp.); branches ascending, leaves rounded at the base, bracts longer than the flowers, calyx-teeth equalling the tube.—VAR. 2, *seroti'na*, Reich. (sp.); branches flexuous upcurved, leaves narrow at the base, bracts shorter than the flowers, calyx-teeth equalling the tube.—VAR. 3, *rotunda'ta*, Ball (sp.); bracts equalling the flowers or shorter,

calyx-teeth shorter than the tube, anthers included. Sussex and Cambridge (I have seen no specimens).—VAR. 4, *diver'gens*, Jord. (sp.); much branched, branches widely spreading.

10. EUPHRA'SIA, *Tournef.* EYEBRIGHT.

Annual or perennial herbs, on parasitic roots. *Leaves* opposite, toothed or cut. *Flowers* in dense secund or interrupted bracteate spikes, white yellow or purple. *Calyx* tubular or campanulate, 4-fid. *Corolla* tubular, 2-lipped; upper lip concave, 2-lobed, lobes broad spreading; lower spreading 3-fid. *Stamens* hidden by the upper lip; anther-cells mucronate. *Stigma* dilated, obtuse, entire or with a small posterior lobe. *Capsule* oblong, compressed, loculicidally 2-valved, few or many-seeded. *Seeds* pendulous, oblong, furrowed.—DISTRIB. Temp. regions; species 12.—ETYM. *εὐφρασάνω*, to *clear*, in allusion to its former use as an eye-medicine.

1. **E. officina'lis,** *L.*; annual, lower leaves crenate, upper cut.

Meadows, heaths, &c.; ascending to 3,600 ft. in the Highlands; fl. May–Sept.—Glabrous or glandular-pubescent. *Stem* 1–10 in., erect, wiry, usually with many opposite branches. *Leaves* ⅛–½ in., sessile, ovate or lanceolate. *Spikes* terminal; bracts leafy; flowers minute. *Calyx* about equalling the bracts, tube ribbed; lobes acute. *Corolla* ⅛–½ in., white or lilac, purple-veined; mid-lobe of lower lip yellow. *Anthers* brown, pubescent, one cell spurred. *Capsule* included or exserted. *Seeds* as in *Bartsia Odontites*. —DISTRIB. Europe (Arctic), N. Asia, W. Asia to the Himalaya, N. America.

VAR. 1, *officina'lis* proper; bracts triangular-ovate broad at the base, lower corolla-lip equalling or exceeding the tube.—VAR. 2, *grac'ilis*, Fries (sp.); more slender, bracts broader narrowed at the base, lower corolla-lip shorter than the tube.—VAR. 3, *marit'ima;* capsule much longer than the calyx. Shores of the Shetlands.

11. RHINAN'THUS, *L.* YELLOW-RATTLE.

Annual erect herbs, black when dry, on parasitic roots. *Leaves* opposite, narrow, serrate. *Flowers* in secund spikes, yellow spotted with violet; bracts broad, cut, cuspidate-toothed. *Calyx* ventricose, compressed, 4-toothed. *Corolla* 2-lipped, tube subcylindric; upper lip obtuse compressed, entire, with a toothed appendage on each side the tip; lower shorter, lobes 3 spreading. *Stamens* 4, hidden by the upper lip; anthers hairy, not spurred. *Style* filiform, tip inflexed, stigma subcapitate. *Capsule* orbicular, compressed, loculicidally 2-valved; valves membranous, entire, bearing the placentas in the middle. *Seeds* suborbicular, compressed, winged, hilum lateral; embryo small.—DISTRIB. Europe (Arctic), excl. Turkey, N. Asia, N. America.—ETYM. *ῥὶν, the nose*, and *ἄνθος, flower*, in allusion to the form of the corolla.

1. **R. Crista-gal'li,** *L.*; erect, leaves deeply crenate-serrate.

Damp pastures and wet places; ascending to 2,500 ft. in the Highlands; fl. May–July.—Glabrous or glandular-pubescent. *Stem* 6–18 in., simple or with opposite branches, 4-gonous. *Leaves* distant, 1–2 in., oblong-lanceolate or linear-oblong, obtuse or acute. *Bracts* longer than the calyx, ovate, taper-pointed. *Calyx* ¼–½ in., mouth small, teeth triangular. *Corolla* ½–1 in., yellow; lobes of upper lip blue. *Anthers* included, bluish. *Capsule* included in the bladdery calyx-tube.

Sub-sp. MA'JOR, *Ehr.* (sp.); tall, much branched, bracts yellow at the base, corolla-tube exceeding the calyx-teeth, lower lip shorter than the upper, lobes of the latter longer than broad, seeds winged or not. - Cultivated fields, local from Moray southwards. VAR. *apterus*, Fries; seeds ribbed not winged.

Sub-sp. MI'NOR, *Ehr.* (sp.); much smaller, stem subsimple, bracts green, corolla-tube equalling the calyx-teeth, lower lip equalling the upper, lobes of the latter shorter, seeds broadly winged.—Grassy places.

12. PEDICULA'RIS, *Tournef.* LOUSEWORT.

Herbs, black when dry; parasitic on roots. *Leaves* alternate whorled or opposite, toothed or pinnatisect. *Flowers* in bracteate spikes or racemes, white red purple or yellow. *Calyx* tubular or campanulate, split anteriorly; teeth 2–5, unequal, entire lobed or crested. *Corolla* 2-lipped, tube cylindric or dilated at the throat; upper lip compressed, entire or notched, or with 2 teeth below the tip; lower 3-lobed. *Stamens* 4, concealed by the upper lip, filaments or the 2 posterior only hairy; anther-cells obtuse. *Capsule* compressed, oblique at the top, loculicidally 2-valved, seeds few, in its lower part. *Seeds* ovoid, testa firm or lax rugose or smooth; embryo short or long.—DISTRIB. N. temp. regions; species upwards of 100.—ETYM. *pediculus*, being supposed to encourage *lice* in sheep.

1. **P. palus'tris,** *L.*; stem erect branched above, calyx ovoid compressed hairy ribbed, lobes subequal crenate.

Bogs and marshes, ascending to 1,800 ft. in the Highlands; fl. May–Sept.—Glabrous or sparingly hairy, annual. *Stem* 6–18 in., stout. *Leaves* 1–3 in., linear-oblong, pinnate; segments oblong, obtuse, crenate or pinnatifid, ultimate rounded. *Bracts* leafy. *Calyx* ¼–⅓ in., reddish-green, ventricose in fruit. *Corolla* 1 in., dull pink; upper lip obtuse 3-toothed; lower broad. *Capsule* exceeding the calyx, curved.—DISTRIB. Europe (Arctic), excl. Spain Greece and Turkey, Siberia, Dahuria.

2. **P. sylvat'ica,** *L.*; stem branched at the base, branches spreading, calyx oblong angled glabrous, lobes unequal foliaceous crenate.

Copses, heaths, and damp meadows, ascending to 2,000 ft. in the Highlands; fl. April–July.—Glabrous, perennial. *Stems* many, 3–10 in., decumbent and ascending from a very short rootstock, leafy. *Leaves* and bracts much as in *P. palustris*, but segments acute. *Spike* lax-flowered. *Calyx* ½ in., 5-lobed, upper lobe entire, the rest foliaceous. *Corolla* 1 in., rose-coloured, tube slender, upper lip 2-toothed. *Capsule* longer than the calyx, obliquely truncate.—DISTRIB. Europe, excl. Greece and Turkey.

13. MELAMPY'RUM, *Tournef.* COW-WHEAT.

Erect, branched, annual herbs, black when dry, parasitic on roots. *Leaves* opposite, cauline narrow entire. *Flowers* axillary and solitary or in leafy spikes. *Calyx* tubular or campanulate; teeth 4, acuminate. *Corolla* 2-lipped, tube cylindric, dilated above; upper lip short, compressed, truncate in front, margins narrowly recurved; lower shorter, 3-lobed, palate prominent. *Stamens* 4, hidden by the upper lip; anthers oblong, hairy, cells mucronate. *Disk* an hypogynous anticous gland. *Stigma* small, obtuse; ovules 2 in each cell, collateral, near the base of the septum, one subsessile erect, the other stalked fixed laterally. *Capsule* compressed, ovate, oblique or falcate, loculicidally 2-valved, 2–4-seeded.

Seeds oblong, testa smooth thickened at the hilum; embryo small.—DISTRIB. Europe, temp. Asia; species 6.—ETYM. *μέλας* and *πυρός, black wheat.*

1. **M. praten'se,** *L.*; flowers axillary secund, bracts entire or toothed, corolla much longer than the calyx-teeth, lips closed, lower straight.

Copses, heaths, and pastures, ascending to 3,000 ft. in the Highlands; fl. June–Sept.—Glabrous or pubescent, very variable. *Stem* 6–24 in., terete, wiry; branches spreading. *Leaves* ½–3 in., ciliate, linear or ovate-lanceolate, sessile or very shortly petioled, quite entire. *Bracts* ciliate, very variable, often toothed laciniate or pinnatifid and sometimes hastate. *Calyx-teeth* lanceolate, ascending. *Corolla* pale yellow, horizontal, tube straight. *Capsule* ovoid, deflexed.—DISTRIB. Europe (Arctic) excl. Turkey, Siberia.

VAR. 1, *praten'se* proper; leaves linear-lanceolate acute, bracts toothed or pinnatifid with slender tips.—VAR. 2, *latifo'lium*; leaves ovate-lanceolate from a broad base, bracts deeply toothed, the upper with short tips. Chalk and limestone districts, Oxford, Monmouth, I. of Wight.—VAR. 3, *monta'num*, Johnst. (sp.); leaves linear-lanceolate, bracts entire with long slender tips.

2. **M. sylvat'icum,** *L.*; flowers axillary secund, bracts quite entire, corolla not much longer than the calyx-teeth, lips not closed, lower deflexed.

Subalpine woods and copses, rare, from Aberdeen to York and Durham; ascending to 1,000 ft. in the Highlands; N.E. of Ireland, raro; fl. July–Aug.—Similar in habit and foliage to *M. pratense*, but flowers suberect; bracts always quite entire; calyx-teeth spreading; corolla smaller, shorter, deep yellow; its tube curved, and capsule not deflexed.—DISTRIB. Europe (Arctic), except Greece and Turkey, Siberia.

3. **M. arven'se,** *L.*; flowers spiked, bracts straight broad pinnatifid, corolla-tube longer than the long slender calyx-teeth, lips closed.

Cornfields, very local, Norfolk, Essex, Herts, I. of Wight; casual or a colonist, *Watson*; fl. July–Aug.—*Stem* 1–2 ft., obtusely 4-gonous, stout, erect, branched, scaberulous. *Leaves* 1–3 in., lanceolate, quite entire or the upper toothed at the base. *Spike* 3–4 in., stout, obscurely 4-gonous; bracts leafy, ½–1 in., rose-purple. *Calyx-teeth* nearly equal, subulate. *Corolla* ¾ in., erect, tube curved, puberulous, rosy, throat yellow; lips dark pink. *Capsule* shorter than the calyx, ovoid, cells 1-seeded. *Seed* oblong, like a black wheat-grain.—DISTRIB. Europe, W. Asia.

4. **M. crista'tum,** *L.*; flowers densely spiked, bracts ovate-cordate acuminate recurved finely pectinate, corolla-tube much longer than the unequal acute calyx-teeth, mouth closed.

Copses and fields in the E. counties, rare, from Hampshire to Norfolk, and Suffolk to Bedford; a colonist? *Watson*; fl. Sept.–Oct.—Puberulous. *Stem* 6–18 in., rigid, erect, obtusely 4-angled. *Leaves* 2–4 in., spreading, narrow linear-lanceolate. *Spike* 1½–2 in., oblong, obtuse, acutely 4-angled with hollow faces; bracts densely imbricate, cordate, purple, teeth very slender, margins folded enclosing the calyx. *Calyx-tube* short, teeth very unequal, upper long subulate. *Corolla* ½ in., tube bent, yellow tipped with purple. *Capsule* exceeding the calyx.—DISTRIB. Europe, Siberia.

ORDER LIV. **OROBAN'CHEÆ.**

Leafless brownish root-parasites. *Stem* usually stout, subsimple, scaly. *Rootstock* thick, prostrate, tuberous, naked or scaly. *Flowers* usually in dense spikes or racemes, sometimes secund, irregular. *Sepals* 4–5, inferior, free or connate. *Corolla* hypogynous, tube curved; limb 2-lipped, rarely regular; upper lip arched, lower 3-fid; throat with 2 villous folds. *Stamens* 4, didynamous, inserted on the corolla-tube; anthers 2-celled, cells spurred at the base, opening by lateral slits or basal pores. *Disk* hypogynous, unilateral, or a gland or 0. *Ovary* of 2 connate carpels; style simple, curved at the tip, stigma capitate 2-lobed; ovules many, rarely few, anatropous, inserted on 2 pairs of free or confluent parietal placentas. *Capsule* 1-celled, 2-valved, few- or many-seeded. *Seeds* minute, testa thick pitted or tubercled, raphe obsolete, albumen fleshy; embryo ovoid, undivided or 2-fid.—DISTRIB. Temp. and trop.; most abundant in S. Europe and E. Asia; genera 14, species 125.—AFFINITIES. With *Scrophularineæ* and *Cyrtandraceæ*, and possibly parasitic forms of these.—PROPERTIES. Astringent and bitter.

Base of corolla persistent.....1. Orobanche.
Corolla deciduous.....2. Lathræa.

1. **OROBAN'CHE**, *L.* BROOM-RAPE.

Flowers usually glandular-pubescent, 1–3-bracteate. *Sepals* 4, usually connate in pairs, with sometimes a small 5th. *Corolla* gaping; upper lip erect, 2-lobed; lower spreading, 3-lobed. *Stamens* included, filaments flattened below; anther-cells spreading. *Disk* glandular or 0. *Ovary* ovoid; style usually glandular, stigma 2-lobed. *Capsule* incompletely 2-valved, many-seeded; valves cohering at the base and usually at the top also.—DISTRIB. Of the Order; species about 70.—ETYM. ὄροβος, *a vetch*, and ἄνχειν, *to strangle*, from its parasitic habit.

SUB-GEN. 1. **Oroban'che** proper. *Stem* usually quite simple. *Flowers* 1-bracteate, ebracteolate. *Calyx-lobes* 2, 2-fid, rarely entire. *Capsule* with the valves coherent above.

1. **O. ma'jor,** *L.*; brown, sepals 1–3-nerved nearly as long as the corolla-tube, upper lip entire, mid-lobe of lower lip longer than the lateral, filaments glabrous below glandular above, stigma yellow. *O. Rapum*, Thuill.

On roots of shrubby *Papilionaceæ*, from Kirkcudbright southwards, rare in Scotland and Ireland, fl. June–Aug.—*Stem* stout, 1–2 ft., swollen at the base. *Spike* rather dense-flowered; bracts equalling or exceeding the corolla. *Sepals* entire or 2-fid. *Corolla* 1 in., yellow and purplish, sub-campanulate, curved; lobes small, waved, scarcely toothed; upper lip arched, scarcely notched.—DISTRIB. Europe from Holland southwards (excl. Turkey), N. Africa.—Reichenbach figures the lobes of lower lip as small and equal, and flower as red-brown. I take this to be *O. major* of Linnæus, who states that it is parasitic especially on *Leguminosæ*, and quotes for it the *Rapum genistæ* of Lobel. There are no specimens in *Linn. Herb.*

2. **O. ela'tior,** *Sutt.*; yellow, sepals 2-fid 2–3-nerved as long as the corolla-tube, lobes of lip subequal acute, filaments glandular below glabrous above, stigma yellow.

Parasitic on *Centaurea Scabiosa*, chiefly in the E. counties from York and Durham southwards, rare; fl. June–Aug.—Habit of *O. major*, of which it is probably a sub-species; but the corolla is narrower, more compressed above, the lobes more toothed. *Bracts* shorter than the corolla, upper lip deeply notched, margins inflexed.—DISTRIB. Europe from Denmark southwards to the Caucasus, Siberia.

3. **O. caryophylla'cea**, *Sm.*; brown, sepals 2-fid several-nerved shorter than the corolla-tube, lobes of lower lip subequal waved and toothed, filaments hairy below glandular above, stigma purple. *O. Galii*, Duby.

On *Galia, Rubi*, &c., S. Kent; fl. June.—*Stem* 6–12 in., stout, swollen at the base. *Spike* lax-flowered; bracts shorter than the corolla. *Corolla* 1 in., tube broad, curved; lobes large, reddish-brown or purplish, spreading; upper lip arched, notched.—DISTRIB. Europe from Denmark southwards (excl. Spain and Greece), Siberia, W. Asia.

4. **O. ru'bra**, *Sm.*; red, sepals entire 1-nerved subulate longer than the corolla-tube, lobes of lip toothed and crisped, lower with the mid-lobe longest, filaments subpilose below, glandular above, stigma pale red. *O. Epithymum*, DC.

On *Thymus* when growing on trap rocks, chiefly on the W. coast, from Ross to Cornwall; N. and W. of Ireland; fl. June–Aug.—*Stem* 4–8 in., tuberous below. *Spike* lax-flowered. *Corolla* ½–¾ in., equalling or shorter than the bracts, dull red; tube broad, curved; lobes small, erose; upper lip arched, almost entire.—DISTRIB. Baltic, France, Italy, Turkey, Germany, Himalaya.

5. **O. mi'nor**, *Sutt.*; yellow-brown or purplish, slender, sepals 1- or more-nerved with long slender points, corolla-tube contracted in the middle, lobes of lower lip subequal or the middle a little the largest, filaments more or less hairy below, stigmas subglobose.

On various plants in many English counties, from the Border to Cornwall; absent from Scotland; one sub-sp. only is found in Ireland; fl. June–Oct. —*Stem* ½–2 ft., rather slender. *Spike* elongate, many-flowered, lax or dense. *Flowers* ½–¾ in.—DISTRIB. Europe from Denmark southwards, N. Africa.

Sub-sp. MI'NOR proper; bracts equalling or exceeding the corolla whose tube is gently curved, limb white or yellowish, lobes of upper lip spreading, of lower nearly equal toothed and waved, stigmas purple. On clover; very rare in Ireland.

Sub-sp. AMETHYS'TEA, *Thuill.* (sp.); corolla much curved in the lower third, upper two-thirds nearly straight, mid-lobe of lower lip much the largest.—Cornwall, Devon, S. Kent, Channel Islands.

Sub-sp. PI'CRIDIS, *F. Schultes* (sp.); very pale, bracts about equalling the flowers, sepals entire or 2-cleft exceeding the slightly-curved corolla-tube 1-nerved, upper lip retuse, tip inflexed, lobes of lower lip toothed nearly equal, stigmas purple.—On *Picris*, Cambridge, S. Kent, I. of Wight, Tenby.

Sub-sp. RED'ERÆ, *Duby* (sp.); spike more lax, sepals 1-nerved, stigma yellowish. *O. barbata*, Eng. Bot. Suppl.—On ivy, Carnarvon and Leicester to Cornwall, I. of Wight.

SUB-GEN. 2. **Phelipæ'a**, *Tournef.* (gen.). *Stem* simple or branched. *Flowers* 3-bracteate. *Calyx* tubular, 4–5-lobed. *Capsule* with the valves free above.

6. **O. cæru'lea**, *Vill.*; blue-purple, stem simple, calyx-lobes 5 lanceo-

late, corolla-tube curved, lobes of both lips acute, filaments almost glabrous, suture of anthers glabrous, stigma white.

On *Achillea Millefolium*, from Norfolk and Monmouth southwards, and in the Channel Is. ; fl. June–Oct.—*Stem* 6–12 in., slender, tough, not tumid below. *Spike* usually dense ; bracts lanceolate. *Corolla-tube* ¾–1 in., curved, upper lip 2-lobed, lobes pale blue with darker veins.—DISTRIB. Europe from Holland southwards, W. Asia to the Himalaya.

O. arena'ria, Bork., erroneously supposed to have been found in Jersey and Alderney, is only distinguishable from *O. cærulea* by the pilose anthers.

2. LATHRÆ'A, *L.* TOOTHWORT.

A pale purplish fleshy root-parasite. *Flowers* 2-seriate in a secund raceme, bracteate. *Calyx* campanulate, regular, 4-fid. *Corolla* gaping, upper lip arched entire, lower smaller 3-toothed. *Stamens* 4, anther-cells spreading at the base. *Disk* glandular, opposite the lower lip of the corolla. *Ovary* with broad placentas subconfluent in pairs, stigma large capitate 2-lobed. *Capsule* 2-valved, many-seeded.—DISTRIB. E. Europe, W. Siberia, Syria, the Himalaya.—ETYM. λαθραιός, *hidden*, from its locality.

1. **L. squama'ria,** *L.* ; raceme decurved in bud, flowers subsessile.

On roots chiefly of hazel in shady places, from Stirling to Devon and Kent ; rather rare in Ireland ; fl. April–May.—Perennial, white or purplish, glabrous or pilose, fleshy, black when dry. *Rootstock* branched, scaly, rootlets attached by tubercular faces to the rootlets of the plant it preys upon. *Stems* 4–10 in., stout, scaly. *Raceme* 4–6 in., bracts like the scales, broadly oblong. *Flowers* ½ in. *Calyx* 2-lipped, lobes broad subacute, shorter than the dull purple arched corolla, which has small erect lobes. *Anthers* coherent, pubescent. *Style* exserted, decurved, stigma purple. *Capsule* ovoid.

ORDER LV. LABIATÆ.

Herbs or shrubs, usually with immersed reservoirs of essential oil ; branches 4-angled, opposite or whorled. *Leaves* opposite or whorled, entire or divided, exstipulate. *Flowers* solitary or in axillary opposite centrifugal cymes, irregular ; bracts 2 at the forks, bracteole opposite the flower. *Calyx* inferior, persistent, 5-cleft, ribbed. *Corolla* hypogynous, deciduous, 5-merous, 2-lipped, imbricate in bud, upper lip outermost. *Stamens* inserted on the corolla-tube, usually 4, uppermost and sometimes the two lateral 0 or imperfect ; anthers 2-celled, polymorphous. *Disk* annular. *Ovary* of 2 connate deeply-lobed carpels, hence 4-partite, 4-celled ; style from between the lobes, slender, stigma entire or 2-fid ; ovules solitary in each cell, erect, anatropous. *Fruit* of 1–4 one-seeded nutlets (the mature lobes of the ovary). *Seed* erect or ascending, testa thin, albumen 0 ; embryo straight, rarely curved, cotyledons fleshy, radicle next the hilum.—DISTRIB. Abundant in warm and temp. regions, rare in arctic and alpine ; genera 120 ; species about 2,500.—AFFINITIES. With *Borragineæ* and *Verbenaceæ*. — PROPERTIES. Stimulant, fragrant, aromatic.

TRIBE I. **SATUREI'JEÆ.** *Corolla-lobes* flat. *Stamens* 2–4, remote, spreading or conniving under the upper lip, 2 upper shorter or 0; anther-cells contiguous or confluent. *Nutlets* free, smooth, or nearly so.

* Corolla subregular. Stamens spreading; anthers 2-celled.

Perfect stamens 4 ..... 1. Mentha.
Perfect stamens 2 ..... 2. Lycopus.

** Corolla 2-lipped. Stamens distant.

Erect, leaves broad. Calyx equally 5-toothed ..... 3. Origanum.
Procumbent, leaves small. Calyx 2-lipped ..... 4. Thymus.

*** Corolla 2-lipped. Stamens 4, conniving under the upper lip.

Corolla-tube straight; upper lip flat ..... 5. Calamintha.
Corolla-tube curved, ascending; upper lip concave ..... 5*. *Melissa.*

TRIBE II. **MONAR'DEÆ.** *Stamens* 2, erect or ascending; anthers 1-celled, or if 2-celled cells remote. *Nutlets* free, smooth, or nearly so.

Calyx 2-lipped ..... 6. Salvia.

TRIBE III. **NEPETE'Æ.** *Stamens* 4, 2 upper longer, ascending or diverging; anther-cells 2 parallel or nearly so. *Nutlets* smooth or tubercled.

Upper lip of corolla truncate ..... 7. Nepeta.

TRIBE IV. **STACHYDE'Æ.** *Stamens* 4, parallel, 2 upper shorter, ascending under the concave upper lip or included in the tube. *Nutlets* free, smooth, or tubercled.

* Calyx 2-lipped, not inflated, lips closing over the fruit.

Filaments 2-fid, anthers all 2-celled ..... 8. Prunella.
Filaments simple, 2 lower anthers 1-celled ..... 9. Scutellaria.

** Calyx inflated or 2-lipped. Anthers under the corolla lip ..... 10. Melittis.

*** Calyx tubular. Anthers within the corolla-tube ..... 11. Marrubium.

**** Calyx 5-10-toothed, subcampanulate, equal or oblique.

Calyx 5-toothed. Anthers glabrous. Nutlets obtuse ..... 12. Stachys.
Calyx-teeth 5, spinous. Anthers ciliate. Nutlets compressed ... 13. Galeopsis.
Calyx-teeth 5, spinous. Anthers glabrous. Nutlets 3-quetrous, truncate. 13*. *Leonurus.*
Calyx 5-nerved. Anthers hairy. Nutlets 3-quetrous, truncate ... 14. Lamium.
Calyx-limb spreading; teeth 5 broad. Anthers glabrous. Nutlets obtuse. 15. Ballota.

TRIBE V. **AJ'UGOIDEÆ.** *Stamens* 4, parallel, ascending, exserted, 2 upper shorter. *Nutlets* connate, base oblique, reticulate and rugose.

Calyx tubular, 5-toothed. Upper corolla-lip 2-partite ..... 16. Teucrium.
Calyx ovoid, 5-cleft. Upper corolla-lip entire or notched ..... 17. Ajuga.

1. MEN'THA, *L.* MINT.

Strong-scented perennial herbs; rootstock stoloniferous, creeping. *Whorls* many-flowered, axillary and remote, or crowded and forming terminal spikes; bracts subulate or foliaceous; bracteoles small or 0; flowers small. *Calyx* campanulate or tubular, 5-toothed; throat naked or villous. *Corolla-tube* short, limb campanulate 4-lobed; lobes nearly equal, upper broader. *Stamens* 4, equal, erect, distant, glabrous; anther-cells parallel. *Style* shortly 2-fid. *Nutlets* dry, smooth.—DISTRIB. Chiefly natives of N.

temp. regions; species about 28.—ETYM. The old Greek name.—Species very variable, and often difficult to discriminate.

* *Whorls* in terminal spikes; bracts minute. *Throat of calyx* glabrous.

† *Leaves all sessile, or the lower only petioled.*

1. **M. sylves'tris,** *L.*; leaves broadly or narrowly oblong-obovate or lanceolate subacute serrate smooth above hoary beneath, spike continuous, calyx-teeth lanceolate, corolla hairy glabrous within. *Horse-mint.*

Moist waste places, rare, from Moray and Dumbarton southwards; a doubtful native of Ireland; fl. Aug.-Sept. —*Stem* 2–3 ft., robust, tomentose with white hairs. *Leaves* 1–3 in., ⅝–2 in. broad, rounded or cordate at the base. *Spikes* 1–3 in., ½–¾ in. broad, dense; bracts lanceolate; bracteoles subulate; pedicels hairy. *Corolla* lilac, about ⅛ in. diam. —DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India.

VAR. 1, *sylvestris* proper; leaves oblong-lanceolate acute rounded at the base slightly hairy above hoary beneath, spikes slender.—VAR. 2, *nemorosa*, Willd. (sp.); leaves broadly oblong acute rounded at the base slightly hairy above tomentose beneath, spike stouter.—VAR. 3, *mollissima*, Bork. (sp.); leaves broadly ovate acute subcordate at the base finely serrate hoary above felted beneath, spikes stout. Rare.—VAR. 4, *alopecuroides*, Hull (sp.); leaves broad large coarsely serrate subcordate at the base somewhat wrinkled above very hairy beneath, spikes short stout, bracts broader. Kent, Essex, Norfolk, &c., rare. The transition state to *M. rotundifolia*.

2. **M. rotundifo'lia,** *L.*; leaves broadly ovate-oblong very obtuse crenate much wrinkled above shaggy or densely tomentose beneath, spikes interrupted, calyx hairy teeth subulate, corolla hairy glabrous within.

Wet places, S. of England, indigenous; a denizen in the N., *Watson*; not found in Scotland; rare in Ireland; fl. Aug.-Sept.—Habit of *M. sylvestris*, but usually much branched. *Leaves* often densely woolly below. *Spikes* dense, cylindric. *Flowers* white or pink.—DISTRIB. Europe from Belgium southwards, N. Africa, Siberia, W. Asia.—A garden escape in N. America.

M. VIRIDIS, *L.*; glabrous or nearly so, leaves oblong-lanceolate subacute serrate smooth above, spikes slender, corolla glabrous without and within. *Spear-mint.*

Wet places in England and Scotland, rare; indigenous in the N. of England, *Baker*; a denizen, *Watson*; not a native of Ireland; fl. Aug.-Sept. — Probably a cultivated form of *M. sylvestris*, easily distinguished by its pungent smell.—DISTRIB. Cultivated for culinary purposes.

†† *Leaves petioled.*

3. **M. piperi'ta,** *Huds.*; glabrous, leaves ovate or oblong-lanceolate acute serrate upper smaller, spikes cylindric interrupted below, pedicels and flowers glabrous or very sparingly hispid. *Peppermint.*

Damp places from Aberdeen southwards and in Ireland; a doubtful native, *Watson*; fl. Aug.-Sept.—Usually smaller and more slender than the preceding. *Leaves* 1–4 in., acute or obtuse at the base, coarsely serrate, smooth above, rarely sparingly hairy on the nerves below, uppermost sometimes bracteiform. *Calyx* often red.—DISTRIB. Europe; introd. in the N. U. States. Probably a garden form of *M. aquatica*, as suggested by Bentham.

VAR. 1, *officinalis*, Hull (sp.); leaves acute or rounded at the base, spikes

elongate.—VAR. 2, *vulga'ris*, Sole; leaves rounded or subcordate at the base, spikes shorter.

4. **M. aquat'ica,** *L.*; usually softly hairy, leaves ovate-oblong or cordate, upper bracteiform, spikes oblong continuous or interrupted below, pedicels and flowers usually hairy or villous.

River-sides, marshes, &c., ascending to 1,500 ft. in Yorkshire; fl. Aug.–Sept. —Very common and variable; some forms are with difficulty distinguished from *M. sativa*. *Stem* 1–5 ft. *Leaves* 1–3 in. *Spikes* ½–1 in. diam., long or short, usually stout. *Flowers* lilac or purplish. *Bracts* and *bracteoles* lanceolate-subulate. *Calyx-teeth* slender.—DISTRIB. Europe, N. Africa, N. and W. Asia; introd. in the N. U. States.

Sub-sp. PUBES'CENS, *Willd.* (sp.); leaves ovate-oblong or lanceolate pubescent above tomentose or woolly beneath sharply serrate, spikes cylindric stout dense, calyx-teeth ¼ the length of the tube.—Mid. and S. England only.—VAR. 1, *palus'tris*, Sole (sp.); leaves ovate-oblong tomentose above, woolly beneath.—VAR. 2, *hirci'na*, Hull (sp.); leaves ovate-oblong green and subglabrous above hairy beneath.

Sub-sp. HIRSU'TA, *L.* (sp.); leaves ovate rounded or subcordate at the base serrate more or less hairy on both surfaces, spikes axillary and terminal ovoid or subglobose, calyx-teeth ½–¾ the length of the tube. Common.—VAR. 1, *hirsu'ta* proper; leaves tomentose on both surfaces, calyx pedicels and corolla hairy.—VAR. 2, *subgla'bra*, Baker; leaves narrower glabrous except on the nerves beneath, calyx pedicels and corolla hairy.—VAR. 3, *citra'ta*, Ehr. (sp.); leaves glabrous on both surfaces, calyx pedicels and corolla glabrous. Staffordshire, Wales, &c., rare. *Bergamot Mint.*

** *Whorls* in axillary clusters, shorter than the leaves; bracts foliaceous. *Throat of calyx* glabrous.

5. **M. sati'va,** *L.*; leaves petioled ovate- or oblong-lanceolate acutely serrate, upper smaller, bracteoles usually shorter than the flowers acuminate, calyx-teeth lanceolate acuminate ½–¾ the length of the tube.

Wet waste places, from Isla and Kincardine southwards; rather rare in Ireland; fl. July–Sept.—Probably a form of *M. aquatica*, distinguished by the inflorescence alone.—DISTRIB. Europe, Canaries; introd. in N. America. —The forms here enumerated are not characterised by certain characters; I have taken their diagnoses from Baker's and Syme's works.

Sub-sp. SATI'VA proper; green, 2–3 ft., leaves hairy on both surfaces, pedicels calyx and corolla hairy. Common in England, rare in Scotland and Ireland. —VAR. 1, hairy, whorls all separate, bracts all foliaceous, upper sometimes flowerless.—VAR. 2, *palu'dosa*, Sole (sp.); hairy, upper whorls collected into a spike with smaller bracts. The passage to *M. aquatica*.—VAR. 3, *subgla'bra*, Baker; almost glabrous, whorls all separate, bracts all foliaceous.

Sub-sp. RU'BRA, *Sm.* (sp.); stem 3–5 ft. and nerves of leaves purple, leaves glabrous or sparingly hairy, calyx hairy, pedicels and corolla glabrous. Not uncommon in England, rare in Scotland and Ireland.

Sub-sp. GRAC'ILIS, *Sm.* (sp.); slender, green, leaves oblong-lanceolate glabrous or sparingly hairy, whorls all separate, bracts all smaller and narrower than the leaves, bracteoles equalling and exceeding the flowers, calyx ciliate, pedicels and corolla glabrous.—VAR. 1, *gracilis* proper, stem hairy below, lower bracts shortly petioled 5–6 times as long as the rather remote whorls. Wiltshire (gathered by Sole only).—VAR. 2, *cardi'aca*, Baker; nearly gla-

brous, bracts sessile 2–4 times as long as the crowded whorls. From Middlesex N. to the Tyne; often cultivated; smells of Basil.

Sub-sp. PRATEN'SIS, *Sole* (sp.); leaves drooping rounded at both ends finely serrate, hairy above, glabrous except on the close-set nerves beneath, whorls in the upper leaves only all separate, calyx-teeth ciliate, pedicels and corolla glabrous. New Forest, gathered by Sole only in 1789.

Sub-sp. GENTI'LIS, *L.* (sp.); leaves spreading ovate acute serrate slightly hairy above and on the (few) nerves especially beneath, bracts all leaf-like uppermost flowerless, pedicels and corolla glabrous, calyx-teeth ciliate. Common in England, rare in Scotland.—VAR. 1, *genti'lis* proper; stem hairy, leaves rather coriaceous most hairy below, calyx-teeth densely hairy.—VAR. 2, *Wirtgeniá'na*, F. Schultz (sp.); stem subglabrous, leaves slightly hairy above, but on the nerves only below, calyx-teeth sparingly hairy.—VAR. 3, *Paulia'na*, F. Schultz (sp.); stem subglabrous, leaves as in var. 2, calyx-teeth densely hairy.

6. **M. arven'sis,** *L.*; leaves petioled ovate- or oblong-lanceolate obtusely serrate, upper smaller, bracteoles shorter than the flowers acute, calyx more or less hairy, teeth triangular ½ the length of the tube, corolla hairy without and within.

Cultivated fields and waste places, ascending to 1,000 ft. in the Highlands; fl. Aug.–Sept.—Usually a low branched plant, 1–2 ft., very variable, chiefly distinguished from *M. sativa* by the short calyx-teeth.—DISTRIB. Europe (Arctic), N. Asia, W. Asia to the Himalaya; introd. in N. America.—To the following varieties many might be added of more or less value.

VAR. 1, *arven'sis* proper; stem short, hairs dense reflexed, leaves smooth hairy all over, calyx very hairy.—VAR. 2, *nummula'ria*, Schreb. (sp.); stem long, hairs few, leaves and calyx sparingly hairy.—VAR. 3, *agres'tis*, Sole (sp.); stem long hairy, leaves coarsely serrate broad often cordate wrinkled and calyx very hairy, bracts smaller upwards.—VAR. 4, *præ'cox*, Sole (sp.); stem stout erect slightly hairy, leaves smooth sparingly hairy, bracts much smaller upwards, calyx-teeth longer. Approaches *M. sativa*.—VAR. 5, *Allio'nii*, Boreau (sp.); stem tall slightly hairy above, nearly glabrous beneath, leaves smooth thinly hairy, bracts uniform, calyx-teeth very short.—VAR. 6, *parietariafo'lia*, Beck (sp.); subglabrous, stem long, leaves smooth serrated towards the tip, bracts smaller upwards, calyx-teeth short.

*** *Whorls* axillary, distant, none towards the ends of the branches. *Calyx* 2-lipped; throat closed with hairs.

7. **M. Pule'gium,** *L.*; prostrate, leaves small shortly petioled ovate or oblong subserrate, calyx-teeth ciliate, corolla hairy without glabrous within. *Penny-royal.*

Pools, wet heaths, &c., from Durham southwards, naturalized only in Scotland frequent in Ireland; fl. Aug.–Sept.—Glabrous or more or less tomentose. *Stems* 4–10 in., prostrate, much branched, very leafy. *Leaves* ¼–¾ in., spreading and recurved, acute at the base. *Whorls* all separate; bracts foliaceous, upper sessile flowerless; bracteoles 0, or obovate and shorter than the flowers. *Calyx* and pedicels pubescent or hispid.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.—Formerly much used medicinally.

2. LYC'OPUS, *Tournef.* GIPSY-WORT.

Marsh herbs. *Leaves* toothed or pinnatifid. *Whorls* axillary, dense, many-flowered; bracts foliaceous, bracteoles minute; flowers small sessile.

Calyx campanulate, equal, 4–5-toothed; throat naked. *Corolla* short, campanulate, equal, 4–5-fid. *Stamens* 4; upper 2 imperfect, filiform, with capitate anthers or 0; 2 lower fertile, distant; anther-cells parallel. *Style* 2-fid, lobes flattened. *Nutlets* dry, smooth, truncate, narrowed below, margins thickened.—DISTRIB. Temp. regions; species probably 2 with many varieties.—ETYM. λύκος and πούς, *wolf's-foot*, of doubtful application.

1. **L. europæ'us,** *L.*; stem acutely 4-angled, calyx-teeth 5 subulate.

Ditches and river-banks from Ross southwards; rarer in Scotland; common in Ireland; fl. June–Sept.—Glabrous or slightly pubescent: *Rootstock* creeping or stoloniferous. *Stem* 1–3 ft., tough. *Leaves* subsessile, elliptic-oblong, coarsely serrate or pinnatifid. *Whorls* many; bracts smaller upwards; flowers sessile. *Corolla* ¼ in., bluish-white, dotted with purple, hairy within.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India, N. America, Australia.

3. ORIG'ANUM, *Tournef.* MARJORAM.

Aromatic herbs or undershrubs. *Leaves* entire or toothed. *Flowers* crowded, in cylindric corymbose cymes, with large coloured imbricating bracts. *Calyx* subcampanulate, 10–13-nerved, 5-toothed or 2-lipped; upper lip entire or 3-toothed, lower 2-toothed truncate or 0. *Corolla* obscurely 2-lipped; upper lip notched or 2-fid; lower spreading, 3-fid. *Stamens* 4, ascending, distant; anther-cells distinct, spreading. *Style-lobes* acute. *Nutlets* dry, smooth.—DISTRIB. Temp. regions of the Old World; species about 20.—ETYM. ὄρος and γάνος, from affecting *hilly* localities.

1. **O. vulga're,** *L.*; erect, corymbosely branched, leaves broadly ovate.

Dry copses and hedgebanks, &c., from Isla and Moray southwards, rare in Scotland; ascends to 1,300 ft. in Yorkshire; local in Ireland; fl. July–Sept.—More or less pubescent, bifariously on the branches. *Rootstock* short, stoloniferous. *Stems* many, 1–3 ft., stout. *Leaves* ½–1 in., shortly petioled, rhombic-ovate, lower early withering, obtusely serrate. *Spikes* ½–1 in., crowded, ovoid, 4-gonous; bracts ¼ in., green or purple, ovate, acute, longer than the calyx. *Calyx* sprinkled with yellow dots, teeth short; throat closed with hairs. *Corolla* purplish or white. *Stamens* exserted or not.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria, W. Asia to the Himalaya; introd. in N. America.—Aromatic, bitter, and balsamic.

4. THY'MUS, *L.* THYME.

Small shrubs, often hoary, much branched, very aromatic. *Leaves* small, quite entire; margins often revolute. *Whorls* few-flowered, distant or crowded, in lax or dense spikes; bracts minute; flowers purple, rarely white. *Calyx* ovoid, 10–13-nerved, 2-lipped; upper lip 3-toothed; lower 2-fid; throat villous. *Corolla-tube* naked within, obscurely 2-lipped; upper lip straight, flattish, notched; lower 3-fid. *Stamens* usually exserted, straight, distant, the lower longer; anther-cells parallel or diverging. *Style-lobes* subequal, subulate. *Nutlets* nearly smooth.—DISTRIB. Temp. regions of the Old World; species 40.—ETYM. The Greek name.

1. **T. Serpyl'lum,** *L.*; prostrate, leaves green flat quite entire.

Hills and dry grassy places; ascends to 3,500 ft. in the Highlands; fl. June–

Aug.—Glabrous or hairy, hairs often reflexed and in lines on the stems. *Rootstock* woody. *Stems* decumbent. *Leaves* ⅛–¼ in., shortly petioled, ovate or obovate-lanceolate, obtuse. *Whorls* capitate; bracts foliaceous; pedicels very short; flowers often 1-sexual. *Calyx* purplish, teeth ciliate. *Corolla* ¼–½ in., rose-purple.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia to the W. Himalaya, Greenland; introd. in N. America.

Sub-sp. SERPYL'LUM proper; flowering-branches ascending from trailing shoots that are barren at the tip, leaves often obovate, whorls in one head, upper lip of corolla oblong.—Commonest form in mountain districts.

Sub-sp. CHAMÆ'DRYS, *Fries* (sp.); flowering- and barren-branches ascending from the crown of the rootstock, leaves usually ovate, whorls in many axillary heads, upper lip of corolla short and broad.

5. CALAMIN'THA, *Mœnch.*

Herbs or shrubs. *Whorls* dense and axillary or loose and panicled; flowers purple white or yellow. *Calyx* tubular, 13-nerved, 2-lipped, upper lip 3-toothed, lower 2-fid; throat naked or villous. *Corolla-tube* straight; throat naked, often inflated; upper lip erect, flattish; lower spreading, 3-lobed. *Stamens* 4, ascending under the upper lip, upper sometimes imperfect; anther-cells parallel or diverging. *Style-lobes* equal, or the lower larger. *Nutlets* smooth.—DISTRIB. Temp. N. hemisphere; species about 40.—ETYM. καλὸς and μίνθα, *beautiful mint.*

SUB-GEN. 1. **Calamin'tha** proper. *Whorls* many, compound, lax, lower many-flowered; bracts minute. *Calyx-tube* straight. *Corolla* with mid-lobe of lower lip notched.

1. **C. officina'lis,** *Mœnch;* perennial, leaves ovate, cymes secund. *Calamint.*

Waste places in dry soil from Westmoreland southwards; Mid. and S. Ireland; fl. July–Sept.—Hairy. *Rootstock* more or less creeping, stoloniferous. *Stem* 1–3 ft., erect or decumbent at the base; branches usually long, straggling and ascending. *Leaves* crenate-toothed, very variable in size and depth of serratures but pretty uniform in shape, almost glabrous or downy or nearly woolly. *Cymes* more or less unilateral, peduncles and pedicels variable.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia; introd. in N. America.

Sub-sp. MENTHIFO'LIA, *Host* (sp.); branches long ascending, leaves 1–1½ in. crenate-serrate green below, cymes few-flowered, calyx bent on the pedicel 2-lipped, teeth with long bristles, upper triangular, lower subulate much longer, hairs of throat included, corolla ⅛ in., mid-lobe of lower lip longest. —Var. *Briggsii,* Syme; larger, more hispid, peduncles of lower whorls equalling or exceeding the pedicel of the central flower. Devonshire.

Sub-sp. NEP'ETA, *Clairv.* (sp.); branches short erect, leaves usually ½–1 in. subentire pale beneath, cymes about 10-flowered, calyx erect on the pedicel, teeth nearly equal, upper triangular recurved, lower subulate, hairs of throat prominent, corolla ⅛ in., mid-lobe of lower lip broad truncate.

Sub-sp. SYLVAT'ICA, *Bromf.*; branches 0 or long ascending, leaves 1–3 in. deeply crenate-serrate, cymes loose, calyx bent on the pedicel 2-lipped ciliate, 3 upper teeth abruptly recurved, 2 lower twice as long incurved, hairs of throat concealed in the tube, corolla ¾–1 in., mid-lobe of lower lip about equalling the lateral.—Chalk banks, I. of Wight.

SUB-GEN. 2. **Clinopo'dium,** *L.* (gen.). *Whorls* few, compound, dense-flowered, surrounded by many linear bracteoles. *Calyx-tube* slightly curved. *Corolla* with mid-lobe of lower lip notched.

2. **C. Clinopo'dium,** *Benth.*; perennial, softly hairy, leaves ovate obscurely toothed. *Clinopodium vulgare,* L. *Wild Basil.*

Copses and rocky places from Moray southwards, and in Ireland; ascends to 1,000 ft. in the Highlands; fl. July–Sept.—*Rootstock* woody, stoloniferous. *Stem* 1–3 ft., slender, flexuous, subsimple. *Leaves* remote, 1–2 in., subacute. *Whorls* terminal and axillary, ¾–1 in. diam., depressed; bracts equalling the calyx; pedicels slender; flowers crowded. *Calyx* ⅛–¼ in., striate, bristly. *Corolla* ¾–1 in., purple, hairy; upper lip longest.—DISTRIB. Europe, N. Africa, N. and W. Asia to Japan and the Himalaya; wild in Canada; introd. in the U. States.

SUB-GEN. 3. **A'cinos,** *Mœnch* (gen.). *Whorls* many, simple, lower 5-6-flowered; bracteoles few, minute. *Calyx-tube* curved. *Corolla* with the mid-lobe of the lower lip almost entire.

3. **C. A'cinos,** *Clairv.*; annual or biennial, branched, leaves petioled ovate acuminate. *Thymus Acinos,* L. *Basil Thyme.*

Banks and fields, on dry soil, from Aberdeen southwards; rare and probably nowhere indigenous in Scotland; N.E. of Ireland, very rare; fl. July–Aug. —More or less pubescent. *Stem* 3–6 in., branched from the base, ascending, slender, leafy. *Leaves* ¼–½ in., narrowed into the petiole, variable in breadth, entire or slightly serrate. *Bracts* leafy; bracteoles shorter than the pedicels. *Calyx* bent on the pedicel; tube much enlarged below in fruit; throat closed with hairs; 3 upper teeth recurved. *Corolla* ½ in., blue-purple, spotted white and darker purple.—DISTRIB. Europe, N. Africa.

5*. *MELIS'SA, Tournef.* BALM.

Herbs, sometimes shrubby. *Whorls* few-flowered, axillary, secund; bracts few, subfoliaceous; flowers white or yellowish. *Calyx* coriaceous, curved, subcampanulate, with 13 ribs, 5 of them very strong, 2-lipped; upper lip flattish, 3-toothed; lower 2-fid. *Corolla-tube* ascending, more or less recurved; throat dilated, naked; upper lip concave, notched; lower 3-fid, lobes flat. *Stamens* 4, converging under the upper lip; anther-cells at length spreading. *Style-lobes* subequal, subulate. *Nutlets* smooth.—DISTRIB. Europe, W. Asia to the Himalaya; species 4.—ETYM. μέλισσα, from bees affecting the plant.—Genus hardly differing from *Calamintha.*

M. OFFICINA'LIS, *L.*; leaves ovate crenate-toothed, flowers white.

Naturalized in the S. of England; fl. July–Aug.—More or less hairy. *Root stock* short. *Stems* 1–2 ft., many, erect. *Leaves* 1–3 in., petioled, wrinkled above. *Whorls* shortly stalked; bracteoles small, oblong. *Calyx-teeth,* upper deltoid recurved with setaceous points; lower longer, slender, straight. *Corolla* ½ in., white or spotted with rose.—DISTRIB. Mid. and S. Europe, W. Asia; a garden escape in N. America.

6. SAL'VIA, *L.* SAGE.

Herbs or shrubs. *Whorls* usually racemed or spiked; bracts leafy or small. *Calyx* tubular or campanulate, 2-lipped, upper lip entire or 3-toothed, lower 2-fid; throat naked. *Corolla-tube* naked or with a ring

of hairs or toothed processes inside; upper lip erect, entire or notched; lower 3-lobed, mid-lobe entire or notched, lateral spreading. *Stamens* 2, filaments short, subhorizontal, jointed below the anther, connective slender, bearing at one end a perfect anther-cell, at the other a rudimentary one. *Disk* forming a large gland anteriorly. *Style* ascending, 2-fid, lobes subulate or dilated. *Nutlets* 3-quetrous, usually shining.—DISTRIB. All temp. and trop. regions; species about 400.—ETYM. *salvo*, from the healing properties of Sage.

1. **S. Verbena'ca,** *L.*; stem leafy, corolla ½ in. glabrous inside. *Clary.*

Dry pastures and waste places from Fife southwards; rare in Scotland and Ireland; fl. June–Sept.—Subglabrous below, glandular-hairy above. *Rootstock* woody. *Stem* 1–2 ft., erect. *Leaves* 2–4 in., wrinkled, radical petioled, oblong, obtuse, irregularly crenate or serrate; upper cauline sessile, oblong or deltoid-ovate. *Whorls* 6-flowered, in long bracteate spikes; bracts ovate-cordate. *Calyx campanulate*, upper lip with recurved edges and minute spinescent teeth, lower tooth subulate. *Corolla* blue-purple; upper lip short, compressed. *Connective* dilated.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia.—The nutlets become mucilaginous in water; formerly used for eye complaints.

2. **S. praten'sis,** *L.*; stem-leaves few, corolla 1 in. tip viscid.

Dry fields, very rare, Cobham, Kent; Middleton Stoney, Oxford; a denizen, *Watson;* fl. June–Aug.—Glandular-hairy, especially above. Habit of *S. Verbenaca*, but larger. *Leaves* wrinkled, 3–6 in.; radical oblong or ovate-cordate, long-petioled, obtuse, sometimes 2-lobed at the base, crenatures large irregular; cauline similar or more oblong, smaller, shorter petioled. *Whorls* about 4-flowered, in spikes 1–1½ ft.; bracts small, ovate-cordate, long acuminate and calyx coloured. *Corolla* bright blue, glabrous inside; upper lip long, compressed, much arched; lower broad. *Connective* dilated.—DISTRIB. Europe from Belgium southwards, W. Asia.

7. NEP'ETA, *L.*

Herbs, erect or prostrate. *Whorls* axillary or terminal; flowers blue yellow or white. *Calyx* tubular, 15-ribbed, 5-toothed, teeth equal or unequal. *Corolla-tube* slender below, throat dilated, naked; upper lip straight, notched or 2-fid; lower 3-fid, mid-lobe large. *Stamens* ⅄, ascending under the upper lip, upper pair longest; anther-cells diverging. *Style-lobes* subulate. *Nutlets* smooth.—DISTRIB. Temp. Europe, N. Africa and Asia; species about 110.—ETYM. The Latin name.

SUB-GEN. 1. **Nep'eta** proper. *Whorls* subterminal; upper bracts small. *Corolla-tube* short; mid-lobe of lower lip suborbicular, concave. *Anthers* subparallel, both cells opening by one slit.

1. **N. Cata'ria,** *L.*; erect, leaves ovate-cordate inciso-serrate white and pubescent beneath, flowers white. *Cat-Mint.*

Banks and waste places, rare in England and Ireland; very local in Scotland; a doubtful native, *Watson;* fl. July–Sept.—Hoary, pubescent. *Rootstock* stout. *Stem* 2–3 ft., branched, very leafy. *Leaves* 1–3 in., deeply lobed at the base. *Whorls* shortly stalked, upper sessile, many and dense-flowered, in broad heads 1 in. long; bracts leafy; bracteoles longer than the short pedicels. *Calyx* pubescent; teeth subulate, upper longest. *Corolla*

½ in., dotted with purple, tube curved. *Nutlets* minutely granulate.—DISTRIB. Europe, Siberia, W. Asia to the Himalaya; introd. in N. America.

SUB-GEN. 2. **Glecho'ma,** *L.* (gen.). *Whorls* axillary; bracts all large and leaf-like. *Corolla-tube* long; mid-lobe of lower lip obcordate, flat. *Anthers* conniving, and forming a cross; cells each with a slit.

2. **N. Glecho'ma,** *Benth.*; procumbent, leaves ovate- or orbicular-reniform deeply crenate green, flowers blue-purple. *Glechoma hederacea,* L. *Ground Ivy.*

Hedgebanks and copses; ascends to near 1,300 ft. in Northumberland; fl. March–June.—Perennial, more or less pubescent. *Stems* 6–18 in., rooting at the base, slender, branched. *Leaves* ½–1½ in. diam., petioles ½–2 in. *Whorls* 3–6-flowered; bracteoles subulate, equalling the short pedicels. *Calyx-teeth* short, recurved. *Corolla* ½–1 in. *Nutlets* minutely granulate. —DISTRIB. Europe (Arctic), N. Asia, Japan, W. Asia; introd. in the N. U. States.—Bitter and aromatic, formerly used for beer, occasionally for tea.

VAR. 1, *Glecho'ma* proper; subglabrous, corolla-tube twice as long as the calyx.—VAR. 2, *parvifo'ra,* Benth.; subglabrous, corolla-tube equalling the calyx.—VAR. 3, *hirsu'ta,* Waldst. and Kit. (sp.); hispidly pubescent, corolla-tube twice as long as the calyx.

8. PRUNEL'LA, *L.* SELF-HEAL.

Small, hairy, perennial herbs. *Whorls* about 6-flowered, in dense terminal heads, surrounded by orbicular leaf-like bracts; flowers purplish, rarely white. *Calyx* subcampanulate, reticulate, 2-lipped, closed in fruit; upper lip flat, 3-toothed; lower 2-lobed; throat naked. *Corolla-tube* broad, ascending, with a short hairy basal ring inside; upper lip erect, concave; lower spreading, lateral lobes deflexed, middle concave. *Stamens* 4, exserted, filaments glabrous 2-toothed at the tip, lower tooth antheriferous; anthers conniving in pairs under the upper lip, cells diverging. *Disk* erect, equal. *Style-lobes* subulate. *Nutlets* oblong, smooth.—DISTRIB. N. and S. temp. regions; species 3.—ETYM. Doubtful.

1. **P. vulga'ris,** *L.*; leaves ovate-oblong, corolla not twice as long as the purplish calyx. *Brunella,* Tournef.

Pastures and waste places; ascends to 2,400 ft. in Yorkshire; fl. July–Sept.—More or less hairy. *Rootstock* creeping. *Stems* 4–12 in., erect or ascending, branches often abbreviated. *Leaves* 1–2 in., petioled, uppermost sessile, ovate-oblong or oblong-lanceolate, entire toothed or subpinnatifid. *Whorls* in cylindric spikes, 1–3 in.; bracts broadly ovate-cordate, ciliate, green with purple edges; bracteoles 0; pedicels very short. *Calyx-teeth* minute, mucronate. *Corolla* ½–¾ in., purple, rarely white.—DISTRIB. Europe (Arctic), N. Africa, temp. Asia, America, Australia.

9. SCUTELLA'RIA, *L.* SKULL-CAP.

Slender herbs, rarely shrubs. *Flowers* solitary or in pairs, axillary or in terminal spikes or racemes. *Calyx* campanulate, 2-lipped; lips entire, closing after flowering, upper surmounted by a broad concave deciduous scale (the posterior lobe of the calyx), lower persistent. *Corolla-tube* long, naked inside, throat dilated; upper lip entire or notched; lower dilated, lateral lobes free spreading, usually connate with the upper lip, rarely with

the lower. *Stamens* 4; anthers conniving in pairs, ciliate, lower 1-celled, upper 2-celled. *Disk* elongate, curved. *Ovary* oblique. *Style* with the upper lobe very short. *Nutlets* smooth or tuberculed.—DISTRIB. N. temp. and subtrop. regions, abundant in America; species about 90.—ETYM. *scutella*, from the *dish*-like scale on the calyx.

1. **S. galeric'ulata,** *L.*; leaves crenate-serrate, flowers ¾ in.

Marshy places, river-banks, &c., from Ross and Harris southwards, rare in Scotland; local in Ireland; fl. July–Sept. –Glabrous or puberulous. *Root-stock* creeping. *Stems* 6–18 in., slender, simple or branched. *Leaves* ½–2½ in., shortly petioled, oblong or ovate, base cordate, obtuse or subacute, crenatures rather remote. *Flowers* secund, pubescent, solitary; bracts leaf-like; bracteoles minute, setaceous; pedicels very short. *Calyx-lobes* short, broad. *Corolla* blue variegated with white inside, 3–4 times as long as the calyx; tube curved; lips short. *Stamens* and style included. *Nutlets* granulate, enclosed in the 2-valved calyx.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, W. Asia to N.W. India, N. America.

2. **S. mi'nor,** *L.*; leaves with 1–2 crenatures near the base, flowers ¼ in.

Swampy heaths and sides of ditches, &c., from Dumbarton southwards, rare except in the W. counties and Ireland; ascends to 1,000 ft. in Devon; fl. July–Oct.—Habit of *S. galericulata*, but only 4–6 in., more slender, often much branched; leaves shorter-petioled or sessile, ½–1 in., obtuse, upper quite entire; flowers much smaller, pale pink-purple.—DISTRIB. Europe from Belgium southwards, excl. Greece and Turkey, W. Asia to the N.W. Himalaya.

10. MEL'ITTIS, *L.* BASTARD-BALM.

An erect perennial herb. *Whorls* axillary, 2–6-flowered; flowers large. *Calyx* broadly campanulate, membranous, nerved; upper lip broad, orbicular, irregularly 2–3-lobed; lower lip with 2 rounded lobes. *Corolla-tube* broad, naked inside, orbicular; lower lip broadly 3-lobed. *Stamens* 4, ascending under the upper lip; anthers conniving in pairs, cells diverging. *Style-lobes* ovate. *Nutlets* smooth or reticulate.—DISTRIB. Europe from France southwards, excl. Greece.—ETYM. Same as *Melissa*.

1. **M. Melissophyl'lum,** *L.*; leaves ovate or oblong crenate-serrate. *M. grandiflora*, Sm.

Copses, from Wales and Gloucester to Somerset, Hants, and Sussex; fl. May–June.—Sparingly pilose. *Rootstock* long, creeping. *Stem* 1–2 ft., erect, simple or branched. *Leaves* subsessile or petioled, hairy on the nerves below. *Bracts* leaf-like; bracteoles 0; pedicels short, stout. *Calyx* very open, lobes all short and broad. *Corolla* 1–1½ in., tube nearly straight, mouth oblique; lips diverging, creamy white, blotched with pink or purple.—DISTRIB. Europe from France southwards.

11. MARRU'BIUM, *L.* WHITE HOREHOUND.

Perennial, tomentose or woolly herbs. *Whorls* axillary; bracts leaf-like; flowers small. *Calyx* tubular, 5–10-nerved; teeth 5–10, subspinous, erect or spreading. *Corolla* short; tube naked or with a ring of hairs inside; upper lip erect; lower spreading, 3-fid, mid-lobe broadest. *Stamens* 4, included; anther-cells diverging, subconfluent. *Style-lobes* short, obtuse. *Nutlets* obtuse.—DISTRIB. Temp. and warm regions of the Old World; species 30.—ETYM. The old Latin name.

1. **M. vulga're,** *L.*; leaves broadly ovate crenate, whorls dense-flowered.

Waste places, from Fife southwards, not common, perhaps not a native; rare in Ireland; fl. July–Nov.—Hoary, pubescence almost woolly. *Rootstock* short, stout. *Stem* 1–1½ ft., stout, branched, leafy. *Leaves* ½–1½ in., cordate or cuneate at the base, nerves stout usually diverging from the broad rather long petiole, much wrinkled, leathery. *Whorls* of innumerable partial ones, depressed, axillary, villous. *Calyx* oblong; teeth 10, short, spinous, hooked at the tip. *Corolla* ½ in., white; tube slender; upper lip long, 2-fid.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India; introd. in N. America. —Aromatic and bitter. Much used as a cough medicine.

12 STA'CHYS, *L.* WOUNDWORT.

Herbs, rarely shrubs. *Leaves* crenate or serrate. *Whorls* 2- or more-flowered, usually in terminal racemes. *Calyx* subcampanulate, 5–10-nerved, 5-toothed, teeth usually equal. *Corolla-tube* cylindric, with usually a ring of hairs inside, often incurved above; throat not dilated; upper lip erect or spreading; lower longer, spreading, 3-lobed, mid-lobe largest, lateral often reflexed. *Stamens* 4, ascending, 2 lower longest; anthers conniving, cells parallel or diverging. *Style-lobes* nearly equal, subulate. *Nutlets* obtuse.—DISTRIB. Chiefly warm N. temp. and oriental regions; species about 160.—ETYM. *στάχυς*, from the *spiked* inflorescence.

SUB-GEN. 1. **Sta'chys** proper. *Whorls* in elongate interrupted spikes or racemes; lower or all the bracts foliaceous. *Anther-cells* diverging.

1. **S. sylvat'ica,** *L.*; perennial, hispid, cauline leaves long-petioled ovate broadly cordate coarsely serrate, whorls 6–12-flowered.

Woods and shady places, ascending to 1,500 ft. in Northumberland; fl. July–Aug.—Fœtid when bruised; softly hispid. *Rootstock* creeping, stoloniferous. *Stem* 1–3 ft., rather slender, solid, simple or branched. *Leaves* 2–4 in., petiole often longer, radical withering early. *Spikes* 4–8 in., hairy and glandular; lower bracts serrate, upper lanceolate quite entire; bracteoles minute; pedicels short. *Calyx-teeth* triangular-subulate, spinescent. *Corolla* ½–¾ in., red-purple; tube equalling or exceeding the calyx; lower lip variegated with white.—DISTRIB. Europe (Arctic), Siberia, N.W. Himalaya.

2. **S. palus'tris,** *L.*; perennial, hairy, cauline leaves shortly petioled or sessile ovate- or oblong-lanceolate, whorls 8–10-flowered.

River-banks and moist places, ascends to 1,500 ft. in Northumberland; fl. July–Sept.—Habit, &c. of *S. sylvatica*, but leaves much narrower; stem stouter and hollow; hairs less coarse; odour not so disagreeable, and flowers paler.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia to the Himalaya, E. and W. N. America.

S. ambigua, Sm. (sp.), is a hybrid nearer *sylvatica* than *palustris*, with leaves always shortly petioled, fruit never maturing. Cultivated ground, not uncommon. Other hybrids nearer to *palustris* than to *sylvatica* are more common.

3. **S. german'ica,** *L.*; biennial, shaggy with white silky hairs, cauline leaves shortly petioled ovate-oblong or lanceolate, spikes stout, whorls very dense-flowered lower remote.

Fields and roadsides on dry soil, very rare, Bedford, Norfolk, Oxford, Kent: an alien or denizen, *Watson*; fl. July–Aug.—*Rootstock* stoloniferous. *Stem*

1–3 ft., very stout, branched. *Leaves* coarsely crenate-serrate, often cordate, wrinkled under the matted hairs; radical 2–5 in., tufted, rather long-petioled. *Whorls* interrupted; upper bracts lanceolate; bracteoles subulate; pedicels very short. *Calyx* villous; upper lip longest; teeth triangular, spinescent. *Corolla* ¼ in., pale rose-purple, pubescent, lower lip spotted.—DISTRIB. Europe from Belgium southwards, W. Asia to N.W. India.

4. **S. arven'sis,** *L.*; annual, sparingly hairy, leaves ovate or oblong obtuse crenate, whorls 4–6-flowered, corolla very small.

Cultivated fields and waste places; rare in Scotland, local in Ireland; a native or colonist, *Watson;* fl. April–Nov.—*Stem* branched from the base; branches 6–18 in., weak, ascending, often rooting below. *Leaves* small, ¼–1 in., base cordate or cuneate, upper sessile; petioles very variable. *Whorls* ⅛–¾ in. diam.; bracts sessile, subacute; bracteoles 0; pedicels short. *Calyx-teeth* longer than the tube, lanceolate-subulate, spinous-tipped. *Corolla* equalling the calyx, ½ in., pale pink variegated with white. — DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America.

SUB-GEN. 2. **Betonʹica,** *L.* (gen.). *Whorls* in short dense terminal spikes; lowest bracts leafy, upper minute. *Anther-cells* parallel.

5. **S. Betonʹica,** *Benth.*; hairs deflexed, leaves petioled oblong-cordate obtuse deeply crenate, whorls all close or the lower only separate, calyx-lobes triangular spinescent. *Betonica officinalis, L. Wood Betony.*

Copses, woods, roadsides, &c. from Skye and Ross southwards, rare in Scotland and Ireland, ascends to 1,200 ft. in Northumberland; fl. June–Aug.—*Rootstock* woody. *Stems* 6–24 in., ascending or erect, simple or sparingly branched from the base. *Leaves* 1–4 in., coriaceous, radical tufted on slender petioles, crenatures large rounded; cauline few, much narrower, more toothed or serrate. *Whorls* in an oblong, obtuse, long-peduncled spike, 1–3 in.; bracteoles as long as the calyx, oblong-lanceolate, awned; pedicels short. *Calyx-teeth* as long as the tube. *Corolla* ¾ in., red-purple, hairy, tube exserted; upper lip erect, lower 3-lobed.—DISTRIB. Europe, N. Africa, W. Siberia.—Formerly much used medicinally.

13. GALEOPʹSIS, *L.* HEMP-NETTLE.

Annual herbs; branches diverging. *Leaves* toothed. *Whorls* many-flowered, dense, axillary and terminal; bracts foliaceous; flowers red orange or variegated. *Calyx* subcampanulate, nearly regular, 5-nerved; teeth 5, spinescent. *Corolla-tube* straight, naked inside, throat dilated; upper lip ovate, arched; lower 3-fid, mid-lobe obcordate or 2-fid; palate with erect teeth at the union of the lobes. *Stamens* 4, exserted; anther-cells opposite, transversely 2-valved, inner valve rounded ciliate, outer larger naked. *Nutlets* rounded, compressed, obscurely reticulate.—DISTRIB. Temp. Europe, W. Asia; species 3.—ETYM. γαλέη and ὄψις, from the resemblance of the corolla to a *weasel's* head.

1. **G. Lad'anum,** *L.*; softly pubescent, nodes not thickened, calyx-teeth not exceeding the tube, corolla red.

Cornfields and waste places, from Skye and Ross southwards, rare in Scotland; E. of Ireland, rare and local; a colonist, *Watson;* fl. July–Oct.—*Stem* 6–18 in.; branches many, ascending. *Leaves* petioled, 1–2 in., ovate-oblong or linear-lanceolate, acute, serrate. *Whorls* few- or many-flowered; bracts sessile; bracteoles linear, spinescent; pedicels very short. *Calyx-teeth*

subulate-lanceolate. *Corolla* ¾–1 in., hairy, rosy, lower lip variegated with white.—DISTRIB. Europe, Siberia, W. Asia; introd. in N. America.

Sub-sp. LAD'ANUM proper (*L. Herb.*); leaves ovate or ovate lanceolate serrate throughout, whorls all separate, tube of corolla equalling the calyx. *G. intermedia*, Villars.—Wheat-fields, Moray.

Sub-sp. ANGUSTIFO'LIA, *Ehrh.* (sp.); leaves narrower connate at the base interruptedly serrate or subentire, upper whorls approximate, tube of corolla much longer than the calyx.—VAR. 1, almost glabrous or minutely pubescent. Common.—VAR. 2, *canes'cens*, Schultz (sp.); very pubescent. Chiefly in the south.

2. **G. dubia,** *Leers*; glandular-pubescent, nodes not thickened, calyx-teeth not exceeding the tube, corolla often yellow. *G. villosa*, Huds.; *G. ochroleu'ca*, Lamk.

Sandy cornfields, rare, from Durham, York, and N. Wales to Essex; a colonist, *Watson*; fl. July–Aug.—Habit of *G. Ladanum*, but glandular; leaves broader, more deeply serrate; whorls dense, almost silky; bracteoles much smaller; calyx-teeth less spinescent; corolla 1–1¼ in., pale yellow, rarely white or purple.—DISTRIB. Europe from Denmark southwards.

3. **G. Tet'rahit,** *L.*; hispid, nodes thickened, calyx-teeth as long as or longer than the tube, corolla yellow and purple or white.

Cornfields and waste places, ascending to 1,300 ft. in Northumberland; a native or colonist, *Watson*; fl. July–Sept.—Usually much larger and stouter than the two preceding, with spreading and deflexed hairs. *Stem* ½–3 ft., stout, succulent, very hispid at the nodes. *Leaves* 1–4 in., rather long-petioled, ovate or ovate-lanceolate, acute or acuminate, very coarsely serrate. *Whorls* dense-flowered; bracts leafy; bracteoles shorter than the calyx; pedicels very short. *Calyx* ½–¾ in.; teeth very long, straight, subulate. *Corolla* 1¼ in.—DISTRIB. Europe (Arctic), N. Asia, W. Asia to N.W. India; introd. in N. America.

Sub-sp. TET'RAHIT proper; corolla ¾ in. rosy or white, tube a little exceeding the calyx, upper lip flattish longer than broad, nutlets slightly convex above on the inner face.—VAR. 1, corolla twice as long as the calyx-teeth, lower lip nearly entire flat.—VAR. 2, *bif'ida*, Bœnn. (sp.); corolla half as long as the calyx-teeth, lower lip notched, margins at length reflexed.

Sub-sp. VERSIC'OLOR, *Curt.* (sp.); corolla larger broader 1–1¼ in. yellow and purple, tube much exceeding the calyx, upper lip arched as broad as long, nutlets very convex above on the inner face.

13*. *LEONU'RUS, L.* MOTHER-WORT.

Erect herbs: *Leaves* lobed. *Whorls* axillary, dense-flowered, scattered; bracteoles subulate; flowers small, pink or white. *Calyx* 5-nerved, turbinate, truncate, with 5 subspinescent spreading teeth. *Corolla-tube* naked, or with an oblique ring within; upper lip entire, erect; lower 3-fid, mid-lobe obcordate. *Stamens* 4; anthers conniving in pairs, cells transverse. *Style-lobes* subulate or obtuse. *Nutlets* smooth, 3-quetrous, truncate at the top.—DISTRIB. Temp. Europe, Asia, and America; species 10.—ETYM. λέων and *οὐρά, lion's-tail.*

L. CARDI'ACA, *L.*; pubescent, lower leaves palmately lobed, upper ovate, bracts subtrifid, corolla-tube with a ring of hairs inside.

Hedges and waste places in England, Scotland, and Ireland, but rare and not

indigenous; fl. July–Sept.—*Rootstock* stout, perennial. *Stem* 2–4 ft., stout, erect, angles prominent, very leafy. *Leaves* very close set, radical on slender long petioles, ovate or orbicular-cordate, margin lobed and toothed; cauline 2–3 in., petioled, cuneate or obovate-oblong, lower multifid, upper 3-fid, palmately 3–many-nerved, lobes acute. *Whorls* very many; bracts large, leaf-like, petioled; bracteoles small, subulate, pungent; flowers sessile. *Calyx* ⅛ in.; teeth broadly triangular. *Corolla* ½ in., woolly, pale rose, upper lip nearly straight. *Nutlets* villous-tipped.—DISTRIB. Europe, Siberia, W. Asia to the Himalaya; introd. in N. America.

14. LA'MIUM, *L.* DEAD-NETTLE.

Annual or perennial hairy herbs, decumbent at the base. *Whorls* many-flowered, axillary, or in leafy bracteate heads; bracteoles 0 or subulate; flowers red purple white or yellow. *Calyx* tubular or subcampanulate; teeth 5, equal, or the upper longer. *Corolla-tube* naked, or with a ring of hairs within, throat dilated; upper lip arched; lower 3-fid spreading, lateral lobes sometimes toothed at the base; mid-lobe broad, base contracted. *Stamens* 4; anthers conniving in pairs, cells diverging. *Style-lobes* subulate. *Nutlets* 3-quetrous, truncate at the top, smooth scaly or tubercled.—DISTRIB. Temp. Europe, Asia, N. Africa; species 35.—ETYM. λαιμός, from the *throat*-like corolla.

SECTION 1. **Lamiop'sis.** Annual (the British sp.). *Corolla-tube* nearly straight, naked or with a ring of hairs, not constricted below the ring; throat very wide. *Anthers* hairy. *Nutlets* with white scales.

1. **L. purpu'reum,** *L.*; leaves petioled cordate crenate, whorls subterminal crowded, calyx slightly hairy, teeth spreading in fruit about as long as the tube.

Fields and waste places; ascends to near 2,000 ft. in Northumberland; fl. April–Oct.—Silkily hairy, or subglabrous. *Stem* 6–18 in., decumbent below, branched from the base, often purplish. *Leaves* ½–2 in., obtuse, petiole as long or longer. *Bracts* crowded, bases not overlapping, upper subsessile, together forming a flat-topped head. *Calyx* about ⅛ in.; teeth triangular with spinous points. *Corolla* ½–¾ in., purple, rarely white; lateral lobes generally 1–2-toothed at the base.—DISTRIB. Europe, Canaries, Siberia, W. Asia; introd. in N. America.

Sub-sp. PURPU'REUM proper; corolla-tube longer than the calyx-teeth, with a ring of hairs within.—VAR. 1, leaves and bracts with shallow crenatures.—VAR. 2, *decip'iens,* Sonder; leaves and bracts deeply crenate.

Sub-sp. HYB'RIDUM, *Vill.* (sp.); corolla-tube shorter than the calyx, ring of hairs within very inconspicuous. *L. dissectum,* With.; *L. incisum,* Willd.

2. **L. interme'dium,** *Fries;* leaves petioled orbicular-cordate crenate, whorls subterminal crowded, calyx slightly hairy, teeth spreading in fruit much longer than the tube.

Cultivated ground in light soils in Scotland and the extreme N. of England; N. of Ireland, rare and local; fl. June–Sept.—Intermediate between *purpureum* (almost united by sub-sp. *hybridum*) and *L. amplexicaule,* of which it has the habit, overlapping upper bracts, and foliage; often stouter and more succulent than either, and the long calyx-teeth distinguish it from both. The tube of the corolla exceeds the calyx and has a very obscure ring of hairs; lateral lobes toothed.—DISTRIB. Chiefly in N. and W. Europe (excl. Spain).

. **L. amplexicau'le,** *L.*; leaves petioled orbicular deeply crenate, whorls distant, calyx densely pubescent, teeth converging in fruit about equalling the tube, corolla-tube long slender. *Henbit Deadnettle.*

Waste sandy places; rather rare in Ireland; fl. May–Aug.—Hairy or almost glabrous. *Stem* 4–10 in., branched from the base. *Leaves* small, ¼–¾ in., lower long-petioled, almost lobulate, base rounded or cordate. *Bracts* sessile, broader than long, many-lobed, bases overlapping. *Corolla* sometimes imperfect, often ¾ in., very slender, rosy, pubescent.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America.

SECTION 2. **Lamioty'pus.** Perennial. *Corolla-tube* curved, ascending, with a ring of hairs inside, constricted below the ring. *Anthers* hairy. *Nutlets* without scales.

4. **L. al'bum,** *L.*; leaves all petioled cordate crenate or serrate, calyx-teeth narrow straight longer than the straight tube, corolla white, tube gibbous at the base below, ring of hairs oblique.

Fields and waste places, from Moray southwards, rare and local in Scotland and Ireland; fl. May–Dec.—More or less hairy. *Rootstock* creeping, branched, stoloniferous. *Stem* 6–18 in., rooting and branched from the base, then erect. *Leaves* 1–3 in., sometimes blotched with white, lower long-petioled, subacute or acuminate, rarely deeply incised. *Whorls* 6–10-flowered, upper crowded, lower remote; bracts shortly petioled. *Calyx* glabrous or hairy; teeth triangular-subulate, with long slender points. *Corolla* ¾–1 in., throat gradually dilated; upper lip vaulted, villous; lateral lobes variable.—DISTRIB. Europe, N. Africa, N. Asia; introd. in N. America.

L. MACULA'TUM, *L.*; leaves all petioled cordate crenate or serrate, calyx-teeth broad strongly recurved as long as the oblique tube, corolla usually purple equal at the base below, ring of hairs transverse.

Waste places, copses, &c., in England and Scotland, not indigenous; fl. June–Sept.—Very closely allied to *L. album*, but the calyx and corolla are different; flowers fewer, rarely white; leaves more wrinkled, and almost always with a median white stripe, and the corolla-throat is suddenly dilated.—DISTRIB. Europe, N. Africa, Siberia, W. Asia.

SECTION 3. **Galeob'dolon,** *Huds.* (gen.). Perennial. *Corolla-tube* curved, ascending, with a ring of hairs inside, constricted below the ring; upper lip stipitate. *Anthers* glabrous. *Nutlets* without scales.

5. **L. Galeob'dolon,** *Crantz;* leaves petioled ovate acuminate doubly-crenate or -serrate, calyx-teeth shorter than the oblique tube, corolla yellow, ring of hairs oblique. *Galeobdolon luteum*, Huds. *Yellow Archangel.*

Hedges and copses, chiefly on chalk and limestone, from Yorkshire southwards, local; E. of Ireland, rare and local; fl. May–June.—Hispid or subglabrous, hairs often reflexed. *Rootstock* short, stoloniferous. *Stems* 6–18 in., flowering erect; barren elongate, prostrate. *Leaves* 1–2 in., petioles variable. *Whorls* remote, 6–10-flowered; upper bracts sometimes lanceolate. *Calyx-teeth* mucronate. *Corolla* ¾–1 in., tube short, gibbous at the base below; lips long, lower spotted red-brown.—DISTRIB. Europe, W. Siberia.

15. BALLO'TA, *L.* BLACK HORKHOUND.

Perennial, hairy or woolly herbs or undershrubs. *Whorls* axillary, dense-flowered; bracteoles subulate; flowers small. *Calyx* tubular or funnel-

shaped, 10-nerved; teeth 5–10, dilated at the base or connate into a spreading limb. *Corolla-tube* with a ring of hairs inside; upper lip erect, concave; lower as long, 3-lobed, spreading. *Stamens* 4, ascending under the upper lip; anthers conniving in pairs, cells at length diverging. *Style-lobes* subulate. *Nutlets* obtuse.—DISTRIB. Europe, N. and S. Africa, temp. Asia; species 23.—ETYM. The Greek name.

1. **B. ni'gra,** *L.*; erect, hairy, calyx-teeth exceeding the corolla-tube.

Hedgebanks, &c. from the Forth and Clyde southwards; rare and seldom indigenous in Scotland and Ireland; fl. July–Aug.—Dull green, hoary or woolly, fœtid. *Rootstock* stout, short. *Stem* 2–3 ft., stout, erect, much branched, hairs usually reflexed. *Leaves* 1–2 in., petioled, ovate- or orbicular-cordate, crenate or almost lobulate. *Whorls* many; cymes pedunculed, 3–6-flowered; bracts leaf-like, bracteoles small; flowers sessile. *Calyx* ¼ in., slightly enlarged in fruit; tube cylindric, strongly ribbed; limb short, expanded; teeth 5, very variable, nerved, spinescent. *Corolla* ½–¾ in., pale red-purple; upper lip hairy outside and in; mid-lobe of lower obcordate. *Nutlets* obtusely 3-gonous, brown, smooth, shining.—DISTRIB. Europe, N. Africa, W. Asia; introd. in N. America.

VAR. 1, *fœtida,* Lamk. (sp.); calyx-teeth deltoid mucronate or spinous-tipped. —VAR. 2, *rudera'lis,* Swartz (sp.); calyx-teeth lanceolate tips long spinous.

16. TEU'CRIUM, *L.* GERMANDER.

Herbs. *Whorls* with leafy bracts or in leafy unilateral racemes or spikes. *Calyx* tubular or campanulate; teeth 5, equal or the upper broader and reflexed. *Corolla-tube* short, naked within; limb obliquely 5-lobed; 2 upper lobes very small, 2 lateral larger, lowest largest, rounded or oblong, often concave. *Stamens* 4, protruded between the 2 upper lobes, 2 lower longest; anther-cells confluent. *Style-lobes* nearly equal. *Nutlets* subglobose, smooth reticulate or pitted, obliquely truncate at the base.—DISTRIB. Temp. and warm regions; species 86.—ETYM. The ancient name.

SECTION 1. **Scorodo'nia,** *Mœnch* (gen.). *Whorls* 2-flowered, in terminal branched 1-sided racemes. *Upper lip* of calyx much dilated.

1. **T. Scorodo'nia,** *L.*; leaves all shortly petioled ovate-cordate crenate, bracts short, calyx gibbous at the base. *Wood Sage.*

Copses, heaths, and hedges, especially in stony soils; ascends to 1,500 ft. in Northumberland; fl. July–Sept.—Perennial; finely pubescent or hairy. *Rootstock* woody, stoloniferous. *Stems* 8–24 in., tufted, usually ascending, rigid. *Leaves* 1–1½ in., in distant pairs, rarely laciniate. *Racemes* 3–6 in., branched at the base; bracts petioled, green; bracteoles 0; pedicels short. *Calyx* broadly campanulate, reticulate in fruit; lobes cuspidate, 4 lower small incurved subulate. *Corolla* ¼ in., ochreous. *Stamens* purplish. *Nutlets* subglobose, smooth.—DISTRIB. Europe, except Russia, N. Africa.—Bitter, aromatic, tonic; a substitute for hops.

SECTION 2. **Scor'dium,** *Benth. Whorls* 2–6-flowered; bracts leaf-like. *Upper lip* of calyx equal to or rather larger than the lower.

2. **T. Scor'dium,** *L.*; leaves sessile oblong coarsely serrate, calyx nearly equal at the base, teeth nearly equal. *Water Germander.*

Wet meadows, very rare; Yorkshire, Norfolk, Cambridge, Devon; S. and W.

of Ireland, very local and rare; a native? *Watson;* fl. July–Aug.—Perennial, fœtid, hairy woolly and glandular. *Rootstock* creeping, stoloniferous. *Stem* 4–10 in., branched from the base, erect or prostrate, leafy. *Leaves* ½–1½ in., narrowed rounded or cordate at the base. *Bracts* leaf-like, sometimes auricled at the base (*T. scordioides*, Bab. not Schreber); bracteoles 0; pedicels short. *Calyx-teeth* straight, short, triangular. *Corolla* ½ in., rose-purple; lower lip spotted. *Nutlets* wrinkled.—DISTRIB. Europe, N. Africa, Siboria, W. Asia to the N.W. Himalaya.

3. **T. Bo'trys,** *L.*; leaves all petioled triangular-ovate pinnatifid, calyx saccate at the base, teeth equal.

Chalky fields, Bookham and Betchworth, Surrey; indigenous, or a colonist, *Baker;* fl. Aug.—Annual, pubescent and glandular with long hairs. *Stem* 4–8 in., erect, much branched from the base, leafy. *Leaves* ½–1 in., segments 3–5 pair, linear, obtuse, lower again lobed; nerves prominent below. *Bracts* leaf-like. *Calyx* large, glandular, inflated and reticulate in fruit; lobes triangular, mucronate. *Corolla* ¾ in., rose-purple, lower lip spotted white and red. *Nutlets* deeply pitted.—DISTRIB. Europe from Belgium southwards, excl. Greece and Turkey, N. Africa.

SECTION 3. **Chamæ'drys,** *Benth. Whorls* 2–6-flowered, all or the upper only in lax terminal racemes. *Calyx-teeth* subequal.

T. CHAMÆ'DRYS, *L.*; leaves petioled ovate incised-crenate, bracts sessile leaf-like, calyx nearly equal at the base, teeth nearly equal.

Old walls in England, Scotland, and sandy fields in Ireland, rare; a garden escape; fl. July–Sept.—Perennial, almost hispidly hairy. *Rootstock* creeping, stoloniferous. *Stem* 6–18 in., ascending, much branched, leafy. *Leaves* ½–1½ in., gradually narrowed into the petiole, nerves prominent beneath. *Whorls* about 6-flowered, in the axils of leafy bracts, or subsecund in leafy terminal spikes; bracts exceeding the calyx, quite entire, acuminate, often purple; upper smaller; pedicels very short. *Calyx-teeth* straight, triangular, spinescent. *Corolla* ¾ in., rosy, lower lip spotted white and red. *Nutlets* nearly smooth.—DISTRIB. Europe from Holland southwards; W. Asia.—A reputed tonic and famous old gout medicine.

17. A'JUGA, *L.* BUGLE.

Annual or perennial herbs. *Whorls* few- or many-flowered; bracts leaf-like; flowers blue purplish or yellow. *Calyx* subcampanulate, 5-fid or 5-toothed. *Corolla-tube* usually with a ring of hairs within, straight or twisted; upper lip short, notched; lower longer, spreading, 3-fid, lateral lobes oblong, middle broader notched or 2-fid. *Stamens* 4, ascending, protruded beyond the upper lip, 2 lower longer; anther-cells diverging, at length confluent. *Style-lobes* subequal. *Nutlets* reticulate or rugose.—DISTRIB. Temp. regions of the Old World, from Europe to Australia; species 30.—ETYM. doubtful.

1. **A. rep'tans,** *L.*; almost glabrous, stoloniferous, leaves repand-crenate, whorls in a loose spike with spreading bracts, flowers blue.

Copses, woods, and pastures, ascending to 2,000 ft. in the Highlands; fl. May–July.—Perennial, subglabrous or piloso, with bifarious lines of hairs on the stem. *Rootstock* short, stout; stolons slender, leafy, tips ascending. *Flowering stem* 6–12 in. *Leaves,* radical 2–3 in., long-petioled, narrowly

obovate, obtuse; those on the stolons small, obovate-spathulate; cauline few, sessile, oblong, obtuse. *Spike* 3–8 in.; bracts subentire, obtuse, much shorter than the upper flowers, upper often purplish; whorls 6–10-flowered; pedicels very short. *Calyx* small, teeth triangular acute ciliate. *Corolla* ½–¾ in., rarely white or rosy, mid-lobe of lower lip broadly obcordate.—DISTRIB. Europe.—A form without stolons (var. *pseudo-alpina*) has been mistaken for *A. alpina*. The *A. alpina* of Smith is the exotic *A. genevensis*, L.

2. **A. pyramid'alis,** *L.*; pilose with soft jointed hairs, leaves obscurely crenate, whorls in a compact pyramidal spike, upper bracts appressed, flowers blue. *A. genevensis*, var. Benth.

Mountain woods and banks of streams in the N. of Scotland, from Argyle to Orkney and the Hebrides; W. of Ireland, Arran Isles and Burren; fl. May–July.—Similar to *A. reptans*, but stolons produced late only; radical leaves very shortly petioled; calyx woolly with longer teeth; lower corolla lip smaller, its mid-lobe less cordate.—DISTRIB. Europe.

3. **A. Chamæ'pitys,** *Schreber;* annual, villous, cauline-leaves 3-partite, flowers solitary in the axils of leaf-like bracts yellow. *Ground Pine.*

Chalky fields, local, from Bedford and Cambridge to Kent and Wilts; a colonist, *Watson;* fl. May–Sept.—*Hairs* long scattered. *Stem* 3–6 in.; branches ascending from the root, densely leafy. *Leaves,* radical early withering, petioled, ovate-lanceolate, entire or toothed; cauline 1–1½ in., spreading, lobes narrow-linear. *Whorls* many, 2-flowered; bracts many times longer than the flowers. *Calyx* hispid; teeth narrowly triangular. *Corolla* ½ in.; lower lip spotted with red. *Nutlets* large, oblong, deeply pitted.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia.

ORDER LVI. VERBENA'CEÆ.

Herbs, shrubs, or trees. *Leaves* opposite or whorled, exstipulate. *Flowers* 2-sexual, cymose, irregular, bracteate. *Calyx* inferior, tubular, cleft or toothed, persistent, imbricate in bud. *Corolla* hypogynous, tubular, usually 2-lipped, imbricate in bud. *Stamens* usually 4, didynamous, inserted on the corolla-tube; anthers 2-celled. *Ovary* 2–4-celled; style simple, terminal, stigma simple or 2-fid; ovules solitary or 2 collateral in each cell, erect and anatropous or ascending and ½-anatropous. *Fruit* a 2- or 4-celled berry, or a drupe with 2–4 1–2-celled stones, or of 4 nutlets. *Seeds* ascending, exalbuminous; cotyledons foliaceous, radicle inferior.—DISTRIB. Chiefly tropical; genera 40; species 550.—AFFINITIES. With *Borragineæ* and *Labiatæ*.—PROPERTIES. Chiefly bitter and astringent.

1. VERBE'NA, *L.* VERVAIN.

Herbs or undershrubs. *Stem* 4-gonous. *Leaves* opposite or 3-nate, simple pinnatifid or 3-partite. *Flowers* bracteate, in terminal spikes or racemes. *Calyx* tubular, 5-ribbed, unequally 5-toothed. *Corolla* salver-shaped; tube straight or curved, villous within; limb oblique, 2-lipped, 5-fid. *Stamens* 4, 2 or all perfect, included. *Disk* annular. *Ovary* 4-celled; style slender, 2-lobed, one lobe only stigmatiferous; ovules solitary

in each cell, erect. *Capsule* splitting into 4 ribbed nutlets.—DISTRIB. Almost wholly American ; species 70.—ETYM. Classical and obscure.

1. **V. officina'lis,** *L.* ; leaves opposite, flowers spiked.

Dry waste ground, local, from Northumberland southwards ; absent from Scotland ; S. and Mid. of Ireland, local ; fl. July–Sept.—Perennial, hispidly pubescent. *Rootstock* woody. *Stems* 1–2 ft., rigid, branched above. *Leaves* oblong, pinnatifid or 3-partite, lobes acute or obtuse, upper narrower. *Spikes* dense-flowered, afterwards elongating ; bracts ovate, acute, ½ as long as the calyx, which is ½ as long as the corolla-tube. *Corolla* lilac, limb ⅛ in. diam. *Nutlets* truncate, granulate.—DISTRIB. Europe, from Denmark southwards, N. Africa, W. Asia to the Caspian and Himalaya ; introd. in N. America.—An object of much superstition amongst the ancients.

ORDER LVII. LENTIBULARI'NEÆ.

Scapigerous herbs, chiefly aquatic or marsh. *Leaves* radical, crowded or whorled, undivided or multifid, exstipulate. *Flowers* solitary racemed or corymbose, irregular, bracteate. *Calyx* free, persistent, 2-labiate or 5-partite. *Corolla* hypogynous, deciduous, personate or 2-lipped, tube short ; upper lip short 2-fid, lower entire or 3-fid ; palate convex. *Stamens* 2, opposite the lateral sepals, hypogynous or inserted on the corolla-tube, filaments short arching ; anthers adnate, 1-celled, transversely 2-valved. *Disk* 0. *Ovary* free, 1-celled ; style short, thick, stigma 2-lipped, upper lip short, lower dilated ; ovules many, anatropous, placenta free basal globose. *Capsule* 2-valved or bursting irregularly, many-seeded. *Seeds* minute, oblong or peltate, placenta spongy, testa striate or pitted sometimes pilose, albumen 0 ; embryo straight, with 1 or 2 small cotyledons.—DISTRIB. Chiefly temp. and cold regions ; genera 3 ; species about 130.—AFFINITIES. With *Primulaceæ.*—PROPERTIES unimportant.

Terrestrial. Stamens on the base of the corolla-tube.....1. Pinguicula.
Aquatic. Stamens on the base of the lip of the corolla.....2. Utricularia.

1. PINGUI'CULA, *Tournef.* BUTTERWORT.

Perennial, succulent, simple herbs. *Leaves* rosulate, quite entire. *Scapes* axillary, ebracteate, 1-flowered. *Flowers* yellow white or purple, inclined or drooping. *Calyx* unequally 5-partite. *Corolla* ringent. *Stamens* hypogynous, filaments stout ascending ; anthers terminal. *Ovary* subglobose. *Capsule* erect, 2–4-valved. *Seeds* oblong, testa rugose.—DISTRIB. N. temp. regions, Fuegia.—ETYM. *pinguis,* from the *greasy* texture.

1. **P. vulga'ris,** *L.* ; calyx-lobes ovate-oblong obtuse, corolla violet, lips very unequal, spur slender about equalling the lower lip.

Wet bogs, &c., rare in the S. of England, common in Scotland and Ireland ; ascends to near 3,000 ft. in the Highlands ; fl. May–July.—Glabrous, except the glandular top of the scape and calyx. *Leaves* 1–3 in., appressed to the ground, oblong, obtuse, succulent, margins incurved, superficial cells pellucid ; petiole broad, very short. *Scapes* several, 4–6 in., purplish. *Calyx-lobes* very variable. *Corolla* ½–1 in. ; lower lip much longer and broader than

the upper; segments broad, obtuse; spur straight or incurved, variable in length. *Capsule* ovoid or subglobose.—DISTRIB. Europe (Arctic), N. Asia, E. and W. N. America.—Leaves used to curdle milk in Lapland.

Sub-sp. VULGA'RIS proper; calyx-lobes more ovate sometimes subacute, corolla ⅔ in., lobes of lower lip not overlapping, spur entire at the tip, capsule ovoid subacute.

Sub-sp. GRANDIFLO'RA, *Lamk.* (sp.); larger, leaves broader, calyx-lobes more oblong rounded at the tip, corolla 1 in., lobes of lower lip very broad overlapping, spur often 2-fid at the tip, capsule subglobose.—Bogs, Cork and Kerry; abundant but introduced in a bog near Penzance.—DISTRIB. W. of France, Alps and Pyrenees, Spain and Portugal.—Apparently a sub-species; the Irish is an extreme form; Alpine and Pyrenean intermediates are numerous.

2. **P. lusitan'ica,** *L.*; calyx-lobes suborbicular, corolla lilac, lips nearly equal, throat yellow, spur short stout conical incurved.

Bogs, in the S.W. of England, local, from Hampshire to Cornwall; W. of Scotland and Ireland, common; ascending to 1,500 ft. in Mayo; fl. June–Oct.—Glabrous. *Leaves* ⅛–½ in., oblong, shortly petioled, thin, succulent, obtuse, margins incurved. *Scapes* very slender. *Corolla* ½ in.; lips nearly equal in length, lobes short broad; spur very broad, obtuse. *Capsule* globose.—DISTRIB. W. of France, Spain, Portugal.

3. **P. alpi'na,** *L.*; calyx-lobes broadly ovate obtuse, corolla white, lips unequal, throat yellow, spur very short conical.

Bogs, I. of Skye, and Rosehaugh in Ross-shire; fl. May–June.—Similar to *P. lusitanica*, but larger, scapes shorter; corolla ½ in., throat hairy; lower lip longer than the upper; spur broader and more obtuse; capsule ovoid, acute.—DISTRIB. Europe (Arctic) N. of the Alps, N. Asia, Himalaya Mts., Greenland, Fuegia.

2. UTRICULA'RIA, *L.*

Aquatic, often floating or terrestrial slender herbs. *Leaves* (of Brit. species) floating, multifid; segments very slender, furnished with floating bladders. *Flowers* solitary spiked or racemed, naked or bracteate. *Calyx* 2-partite, lobes subequal. *Corolla* personate. *Stamens* inserted on the upper lip of the corolla, filaments incurved; anthers subterminal, coherent, simple or constricted in the middle. *Ovary* short. *Capsule* globose, bursting irregularly. *Seeds* oblong or peltate, striate, pitted or covered with capitate or glochidiate hairs.—DISTRIB. Widely dispersed; species 120.—ETYM. *utriculus*, from the *bladder-like* floats.

1. **U. vulga'ris,** *L.*; leaves spreading pinnately multifid, bladders on the young leaves, spur conic acute half as long as the lip.

Pools and ditches, rather scarce, ascends to 1,500 ft. in the Highlands; fl. July–Aug.—*Stems* 6–18 in., stout, leafy. *Leaves* ¾–1 in., broadly ovate in outline; segments subulate, very slender, remotely toothed; bladders ⅛–¼ in., shortly stalked. *Scape* 4–8 in., very stout, 4–8-flowered; pedicels much longer than the calyx. *Corolla* ¾ in., yellow; palate prominent; spur appressed to the under lip. *Anthers* cohering.—DISTRIB. Europe, N. Africa, Siberia, N. America.

Sub-sp. VULGA'RIS proper; pedicels 2–3 times as long as the calyx reflexed

after flowering, upper lip of the corolla as long as the palate, lower projecting a little, recurved.

Sub-sp. NEGLECTA, Lehm. (sp.); more slender, pedicels 4–6 times as long as the calyx straight and ascending after flowering, upper lip of corolla 2–3 times as long as the palate, lower forming a broad flat projection.—Essex.

2. **U. interme'dia,** *Hayne;* leaves distichous dichotomously multifid, bladders on the leafless branches, spur conic acute half as long as the lip.

Pools and ditches, rather rare; fl. July–Sept.—*Stems* slender, 4–8 in. *Leaves* close set, ½–¾ in. broad, orbicular in outline; segments subulate, distantly toothed; bladders ⅛–¼ in. long, on slender stalks. *Scape* rather stout, 3–4-flowered; pedicel equalling or much exceeding the calyx. *Corolla* ½ in., pale yellow; upper lip twice as long as the prominent palate; lower broad, flat; spur appressed to the under lip. *Anthers* free.—DISTRIB. Europe N. of the Alps, N. Asia, N. America.

3. **U. mi'nor,** *L.*; leaves dichotomously multifid, bladders on the leaves, spur minute obtuse.

Pools and ditches, rare in Great Britain, commoner in W. Ireland; fl. June–Sept.—*Stems* capillary, 3–10 in. *Leaves* lax, ⅛–¼ in. broad, orbicular in outline; segments subulate, quite entire; bladders ⅛ in., on slender stalks. *Scapes* 2–6 in., 2–6 flowered; pedicels 2–3 times as long as the calyx. *Corolla* ¼ in., pale yellow; upper lip as long as the inconspicuous curved palate, lower lip broad. *Anthers* free.—DISTRIB. Europe (excl. Spain, Greece, and Turkey), N. Africa, Siberia, W. Asia to the Himalaya, N. America.

ORDER LVIII. PRIMULA'CEÆ.

Perennial, rarely annual herbs. *Leaves* all radical, or if cauline usually opposite or whorled, exstipulate. *Flowers* 2-sexual, regular. *Calyx* inferior, superior in *Samolus*, 5- (rarely 4–9-) cleft. *Corolla* usually hypogynous (0 in *Glaux*), rotate bell- or funnel-shaped, 5- (rarely 4–9-) cleft. *Stamens* inserted in the corolla-tube opposite its lobes, with sometimes alternating staminodes (hypogynous in *Glaux*), filaments usually short; anthers bursting inwards by slits, rarely by terminal pores. *Ovary* 1-celled; style simple, stigma undivided; ovules many, amphitropous rarely anatropous, placenta free central. *Capsule* 1-celled, dehiscing by simple or 2-fid valves or transversely. *Seeds* sunk in cavities of the placenta, testa thin, hilum usually ventral, albumen fleshy or horny; embryo terete, parallel to the hilum.—DISTRIB. N. temp., arctic, and mountain regions, Chili and Fuegia; genera 18; species about 200.—AFFINITIES. With *Myrsineæ* and *Plumbagineæ*.—PROPERTIES unimportant.

TRIBE I. **PRIMULE'Æ.** *Ovary* superior. *Capsule* valvular. *Hilum* ventral.

Leaves radical.	Rootstock woody or fleshy. Flowers umbelled	1. Primula.
Leaves radical.	Rootstock tuberous. Scapes 1-flowered	1*. *Cyclamen.*
Leaves caulino.	Calyx 5-partite. Corolla yellow	2. Lysimachia.
Leaves cauline.	Calyx 5–9-partite. Corolla white	3. Trientalis.
Leaves caulino.	Calyx campanulate, coloured. Corolla 0	4. Glaux.

TRIBE II. **ANAGALLI'DEÆ.** *Ovary* superior. *Capsule* opening transversely. *Hilum* ventral.

Calyx 4-partite.	Filaments glabrous	5. Centunculus.
Calyx 5-partite.	Filaments villous	6. Anagallis.

TRIBE III. **HOTTO'NIEÆ.** *Ovary* superior; ovules anatropous. *Capsule* valvular. *Hilum* basal .....7. Hottonia.

TRIBE IV. **SAMOLE'Æ.** *Ovary* inferior; ovules anatropous. *Capsule* valvular. *Hilum* basal.....8. Samolus.

1. PRI'MULA, *L.*

Scapigerous, perennial herbs. *Flowers* in involucrate umbels, white yellow or purple. *Calyx* 5-toothed or -fid. *Corolla* funnel- or salver-shaped, throat naked or with 5 swellings; lobes 5, erect or spreading. *Stamens* 5, included. *Ovary* ovoid or globose; style filiform, stigma capitate; ovules many, amphitropous. *Capsule* 5-valved at the top, many-seeded, valves simple or 2-fid. *Seeds* plano-convex, peltate, testa punctate. —DISTRIB. Of the Order; species about 50.—ETYM. *primus*, from flowering early.—Flowers usually dimorphic, having long styles with anthers deep in the tube, or the reverse.

* *Leaves not mealy beneath, wrinkled and toothed. Calyx-tube 5-angled.*

1. **P. vulga'ris,** *Huds*; leaves and umbels subsessile, flowers spreading or suberect, calyx-teeth acuminate, corolla pale yellow, limb flat, throat contracted with thickened folds. *Primrose.*

Copses, pastures, and hedgebanks, ascends to 1,600 ft. in Yorkshire; fl. April–May.—*Rootstock* stout, fleshy. *Leaves* 3–6 in., obovate-spathulate, beneath and inflorescence covered with soft jointed hairs. *Umbels* so sessile that the pedicels resemble scapes, which are about as long as the leaves; bracts linear. *Calyx* ½–¾ in., a little inflated, 5-angled. *Corolla* 1–1½ in., rarely purplish, greenish when dry; lobes orbicular, notched. *Capsule* as long as the calyx-tube, ovoid, on prostrate pedicels.—DISTRIB. Europe, except the N.E.; N. Africa.—Varies in the inflorescence being sessile (*P. acaulis*, Jacq.) or a more or less peduncled umbel (vars. *caulescens* and *intermedia*), (if these be not hybrids, as suggested by Baker). The origin of the *Polyanthus*. For hybrids see *P. veris*.—Rootstock emetic.

2. **P. ela'tior,** *Jacq.*; petioles winged, umbels peduncled, flowers horizontal or drooping, calyx-teeth acuminate corolla pale yellow, limb concave, throat open without folds. *Oxlip.*

Copses and meadows in Suffolk, Cambridge, and Essex; fl. April–May.—Intermediate between *P. vulgaris* and *veris*, differing from the former in the less inflated calyx, shorter pedicels, inodorous flowers, and capsule longer than the calyx-tube; it hence resembles hybrids between *P. veris* and *officinalis*, but differs from these by the more villous calyx, paler flowers, and absence of folds at the mouth of the corolla.—DISTRIB. Europe from Gothland southwards, excl. Greece and Turkey, Siberia.

3. **P. ve'ris,** *L.*; petioles winged, umbels peduncled, flowers drooping, calyx-teeth obtuse, corolla buff-yellow funnel-shaped, limb much cupped, throat open with obscure folds. *P. officinalis*, Jacq. *Cowslip, Paigle.*

Meadows, pastures, and hedgebanks; ascends to 1,600 ft. in Northumberland; fl. April–May.—Besides the characters given above, *P. veris* differs from *P. elatior* in the short and often glandular pubescence of the pedicels and calyx; shorter pedicels; odorous flowers; much smaller corolla-limb; and capsule much shorter than the calyx-tube. —DISTRIB. Europe, Siberia,

W. Asia, N. Africa?—Hybrids with *P. vulgaris* include *P. elatior* of older English botanists, probably *P. veris*, β *elatior*, L., and *P. variabilis*, Goupil.

** *Leaves very mealy beneath, not wrinkled. Calyx-tube terete.*

4. **P. farino'sa,** *L.*; calyx-lobes longer than its tube a little shorter than the corolla-tube, corolla-lobes lilac distant, capsule cylindric-oblong twice as long as the calyx. *Bird's-eye Primrose.*

Bogs and meadows on the Pentlands, and in England, from Yorkshire (ascending to 1,800 ft.) northwards; fl. June–July.—*Leaves* 1½–2 in., obovate-spathulate, variable in breadth, crenulate, obtuse or subacute, glabrous above, meal below white or sulphur-coloured. *Scape* stout, 2–8 in., rarely 0. *Flowers* erect or spreading, crowded; bracts small, saccate at the base; pedicels usually shorter than the calyx. *Calyx-tube* oblong-obovoid, mealy; lobes linear-oblong, obtuse. *Corolla* ⅓–½ in. diam.; lobes flat, wedge-shaped, 2-fid; mouth yellow, contracted, with rounded folds.—DISTRIB. Europe (Arctic), Siberia to Mongolia, Greenland, N. U. States, Fuegia.

5. **P. scot'ica,** *Hook.*; calyx-lobes equalling its tube much shorter than the corolla-tube, corolla-lobes blue-purple contiguous, capsule shortly oblong scarcely exceeding the calyx.

Pastures in Orkney, Caithness, and Sutherland; fl. June–Sept.—Perhaps only a sub-species of *P. farinosa*, but smaller; bracts less saccate; leaves broader in proportion, and calyx shorter. Syme states that the flowers of *P. farinosa* are dimorphic, and of *P. scotica* not so, for single plants seed freely, also that it has three flowering seasons.—DISTRIB. Lapland (Arctic), Norway, and Sweden.—*Scape* sometimes 0 (var. *acaulis*).

1*. *CYC'LAMEN*, *Tournef.* SOWBREAD.

Herbs with large tuberous rootstocks. *Leaves* all radical, petioled, broad. *Scapes* 1-flowered, erect, naked, coiled spirally when fruiting. *Flowers* nodding, white pink or lilac. *Calyx* 5-partite. *Corolla-tube* short, throat thickened; lobes 5, large, reflexed. *Stamens* 5, inserted at the base of the corolla, included; anthers cuspidate. *Ovary* globose; style short, stigma simple; ovules many, amphitropous. *Capsule* 5-valved, many-seeded, valves reflexed. *Seeds* subglobose, angled, peltate.—DISTRIB. S. Europe, N. Africa, W. Asia; species 6–8.—ETYM. κύκλος, from the spiral peduncle.

C. HEDERÆFO'LIUM, *Willd.*; tuber fibrous all over, leaves and flowers autumnal. *C. europæum*, Sm. not L.

Hedgebanks and copses in Kent, Sussex, &c.; a denizen, *Watson;* fl. Sept.—*Tuber* 1–3 in. diam., turnip-shaped. *Leaves* appearing after the flowers, ovate-cordate, crenulate, 5–9-angled, dark green with a whitish mottled border, often purple beneath. *Scapes* 4–8 in. *Calyx-lobes* ovate-lanceolate, acute. *Corolla-lobes* 1 in., white or pink, red at the base. *Fruit* ½ in. diam.—DISTRIB. of the genus.—Root acrid and purgative.

2. LYSIMA'CHIA, *L.* LOOSE-STRIFE.

Erect or procumbent herbs. *Leaves* alternate opposite or whorled, quite entire, sometimes glandular-dotted. *Flowers* axillary or terminal, solitary racemed or spiked, yellow white pink or purple. *Calyx* 5–6-partite.

Corolla rotate; segments 5–6, spreading or conniving. *Stamens* 5–6, inserted on the throat, filaments sometimes connate below. *Ovary* subglobose; style filiform, persistent, stigma obtuse; ovules many, amphitropous. *Capsule* subglobose, 5-valved, many-seeded. *Seeds* plano-convex, peltate.—DISTRIB. N. temp. zone, rarer in trop. mts. and in S. Africa and Australia; species 40.—ETYM. obscure.

SECTION 1. **Lysimas'trum,** *Duby. Flowers* yellow, axillary, solitary or in terminal panicled cymes. *Corolla-lobes* without alternating teeth. *Stamens* included. *Seeds* margined.

1. **L. vulga'ris,** *L.*; erect, pubescent, leaves opposite and whorled ovate-lanceolate punctate, cymes panicled, filaments connate below.

River-banks, &c., from Mull and Aberdeen southwards, rare in Scotland; local in Ireland; fl. July–Aug.—*Rootstock* creeping, stoloniferous. *Stem* 2–4 ft., pubescent above. *Leaves* 2–4 in., sessile, with black glands, glabrous or pubescent below. *Cymes* panicled in the upper axils; bracts linear. *Calyx-lobes* lanceolate, ciliate, edges red. *Corolla* ½ in., subcampanulate, deep yellow with orange dots inside; lobes ovate, not ciliate. *Capsule* globose. *Seeds* 3-gonous, rough.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, with a very closely allied Australian representative.

2. **L. nem'orum,** *L.*; procumbent, leaves opposite shortly petioled ovate acute, peduncles slender solitary axillary 1-flowered, sepals linear-subulate, filaments free eglandular. *Yellow Pimpernel.*

Copses, hedgebanks, &c., ascending to 2,500 ft. in the Highlands; fl. May–July.—Glabrous, shining, eglandular. *Stems* slender, 3–12 in. *Leaves* 1–2 in. *Peduncles* capillary, curved, as long as or exceeding the leaves. *Corolla* rotate, ¼–½ in. diam.; lobes spreading, not ciliate. *Filaments* very slender, glabrous. *Capsule* small, globose.—DISTRIB. Europe, excl. Russia Greece and Turkey.

3. **L. Nummula'ria,** *L.; prostrate, leaves opposite ovate-cordate or orbicular obtuse, peduncles axillary 1-flowered, sepals broad, filaments connate at the base glandular. Creeping Jenny, Money-wort.*

Moist shaded places in England, rare if native in Scotland and Ireland; fl. June–July.—Glabrous, shining. Stems 1–2 ft., rather stout, pendulous. Leaves ¾–1¼ in., shortly petioled, dotted with sunk glands. Peduncles stout, but equalling the leaves, solitary, rarely in pairs. Sepals ovate-cordate, acute. Corolla ¾ in. diam., cup-shaped; lobes obtuse, ciliate and glandular. DISTRIB. Europe; a garden escape in the N. U. States.

SECTION 2. **Naumber'gia,** *Mœnch* (gen.). *Flowers* yellow, in dense bushy racemes. *Corolla-lobes* with minute alternating teeth. *Stamens* slender style exserted. *Seeds* scarcely margined.

L. thyrsiflo'ra, *L.*; erect, leaves opposite sessile lanceolate.

Lakes and canal banks, rare and local; Lanark, Forfar, York, Cumberland, Nottingham, Wilts, and Chester; absent from Ireland; fl. June–July.—Glabrous or nearly so. *Rootstock* creeping, stoloniferous. *Stem* 1–3 ft., erect, simple. *Leaves* rarely whorled, lower small, upper 2–3 in., covered with black dots. *Racemes* ¾–1½ in., from the lower axils, cylindric; peduncle long, suberect; pedicels ⅛ in., as long as the calyx; bracts and calyx-lobes

linear, dotted. *Corolla* ¼ in., campanulate, lobes 5–6, narrow, dotted. *Filaments* connate at the very base. *Capsule* ovoid.—DISTRIB. Europe N. of the Alps, Siberia, Dahuria, N. America.

3. TRIENTA'LIS, *L.* CHICKWEED-WINTER-GREEN.

Erect, simple, glabrous herbs; rootstock slender creeping. *Leaves* in one whorl of 5–6, with a few small alternate scales beneath the whorl. *Flowers* white; ebracteate, solitary on slender peduncles. *Calyx* 5–9-partite. *Corolla* rotate, 5–9-partite. *Stamens* 5–9, filaments filiform. *Ovary* globose; style filiform, stigma obtuse; ovules few, amphitropous. *Capsule* globose, 1-celled, few-seeded, valves 5 revolute. *Seeds* flattened, peltate, crowded, cohering by the membranous epidermis of the testa.—DISTRIB. One European and one N. American species.—ETYM. doubtful.

1. **T. europæ'a,** *L.*; leaves obovate or obovate-lanceolate.

Subalpine woods, from York and Lancashire northwards, rare and local; ascends to 2,800 ft. in the Highlands; absent from Ireland; fl. June–July.—*Stem* wiry, slender, 4–8 in., leafy at the top. *Leaves* 1½–2½ in., shining, rigid, obtuse or acute, narrowed into short petioles. *Flowers* erect, few. *Peduncles* 1–3 in., filiform. *Sepals* linear-subulate. *Corolla* ½–¾ in. diam.; lobes ovate, acute. *Capsule* size of a pea; valves very deciduous. *Seeds* hexagonal, testa grey-white punctate.—DISTRIB. Europe (Arctic), N. of the Alps, and Italy, Siberia to Kamtschatka.

4. GLAUX, *Tournef.* SEA MILKWORT.

A small rather succulent glabrous herb; rootstock creeping, stoloniferous. *Leaves* decussate. *Flowers* small, axillary, sessile, white or pink. *Calyx* 5-partite, coloured. *Corolla* 0. *Stamens* 5, hypogynous, alternate with the calyx-lobes. *Ovary* subglobose; style filiform, stigma obtuse; ovules few, amphitropous. *Capsule* globose, 5-valved, few-seeded. *Seeds* peltate.—DISTRIB. Europe (Arctic), except Turkey, N. Asia, W. Asia to the N.W. Himalaya, N. America.—ETYM. γλαυκός, of a *sea-green* colour.

1. **G. marit'ima,** *L.*; glabrous, leaves 4-farious sessile quite entire.

Muddy sea-shores and estuaries; also in salt districts of Worcester and Stafford; fl. June–July.—*Stem* 6–10 in., procumbent, rarely suberect. *Leaves* ¼–¾ in., linear- or obovate- or ovate-oblong. *Flowers* suberect. *Calyx* ⅛–¼ in., campanulate, margins of the obtuse lobes scarious. *Anthers* subexserted. *Capsule* small, globose, cuspidate. *Seeds* plano-convex, testa rough.

5. CENTUN'CULUS, *L.* BASTARD PIMPERNEL.

Very small annual herbs. *Leaves* subopposite or alternate. *Flowers* minute, solitary, axillary, subsessile, ebracteate, white or pink. *Calyx* 4–5-partite. *Corolla* short, urceolate, persistent; tube subglobose; limb 4–5-partite. *Stamens* 4–5, on the throat of the corolla, exserted, filaments flattened. *Ovary* subglobose; style filiform, stigma obtuse; ovules many, amphitropous. *Capsule* globose, bursting transversely, many-seeded. *Seeds* peltate.—DISTRIB. Europe, Asia, America; species 3.—ETYM. doubtful.

1. **C. min'imus,** *L.*; glabrous, leaves ovate or ovate-lanceolate.

Wet turfy and sandy places, local, from Moray southwards; rare in Ireland; fl. June–July.—*Stem* 1–3 in., branched from below. *Leaves* ⅒–¼ in., very

shortly petioled, ovate or ovate-lanceolate. *Flowers* numerous, white or pink. *Sepals* lanceolate, longer than the erect usually 4-lobed corolla. *Filaments* naked. *Capsule* mucronate. *Seeds* 3-gonous, testa areolate:—DISTRIB. Europe, excl. Greece and Turkey, Azores, Siberia, Andes, Brazil.

6. ANAGAL'LIS, *Tournef.* PIMPERNEL.

Slender annual or perennial herbs. *Leaves* opposite, quite entire. *Flowers* on axillary 1-flowered peduncles, ebracteate, red or blue rarely white. *Calyx* 5-partite. *Corolla* rotate or funnel-shaped, 5-partite. *Stamens* 5, on the base of the corolla-tube; filaments filiform villous free or connate below. *Ovary* globose; style simple, stigma obtuse; ovules many, amphitropous. *Capsule* globose, bursting transversely, many-seeded. *Seeds* plano-convex, peltate.—DISTRIB. Europe, temp. Asia, N. Africa, S. America; species 6–8.—ETYM. The Greek name.

1. **A. arven'sis,** *L.*; annual, erect or procumbent, leaves sessile ovate or lanceolate dotted beneath, sepals almost equalling the rotate corolla. *Poor Man's Weather-glass.*

Fields and waste places, from Moray and Banff southwards; a colonist in Scotland, *Watson;* fl. May–Oct.—Glabrous, glandular-dotted. *Stem* 6–18 in., branched from the base, 4-angled; branches ascending. *Leaves* ½–1½ in., rarely in whorls of 3-4, sometimes cordate, acute. *Peduncles* 1–2 in., slender, erect in flower, decurved in fruit. *Sepals* narrow-lanceolate, acuminate. *Corolla* ⅓–½ in. diam., opening in clear weather, lobes often ciliate. *Capsule* size of a small pea. *Seeds* 3-gonous.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to the Himalaya; introd. in America.

VAR. 1, *phœnic'ea,* Lamk. (sp.); corolla scarlet rarely pink, or white with a purple eye (var. *pallida*), lobes usually glandular-ciliate.—VAR. 2, *cæru'lea,* Lamk. (sp.); more erect, corolla bright blue, lobes rarely ciliate. Rare.

2. **A. tenel'la,** *L.*; perennial, creeping, leaves shortly petioled broadly ovate or orbicular not dotted, sepals much shorter than the funnel-shaped corolla. *Bog Pimpernel.*

Marshes and wet meadows, especially in the W. of Great Britain, and in Ireland; fl. July–Aug.—Glabrous, rather succulent. *Stems* 3–4 in., 4-angled. *Leaves* ⅛–½ in., bifarious, opposite or subopposite. *Peduncles* 1–2 in., rather stout. *Sepals* linear-subulate. *Corolla* ¼ in. diam., rosy with dark veins. *Filaments* united at the base. *Capsule* very small. *Seeds* as in *A. arvensis.*—DISTRIB. Europe from Belgium southwards, except Russia, E. Siberia, N. Africa, temp. S. America?

7. HOTTO'NIA, *L.* WATER-VIOLET.

Floating herbs. *Leaves* submerged, whorled, pectinate and multifid. *Flowers* racemose, white or lilac, pedicels whorled. *Calyx* 5-partite. *Corolla* salver-shaped; throat thickened; limb 5-partite, fringed at the base. *Stamens* 5, included. *Ovary* globose; style filiform, persistent, stigma obtuse; ovules many, anatropous. *Capsule* 5-valved; valves cohering at the top, many-seeded. *Seeds* angled, hilum basilar.—DISTRIB. Europe, N. America; species 2.—ETYM. Pierre Hotton, an early Leyden professor of botany.

1. **H. palus'tris,** *L.*; sepals subacute, equalling the corolla-tube.

Ponds and marshes, local, from Durham and Westmorland southwards to Hampshire; Co. Down in Ireland; fl. May–June.—Pale green, glabrous, except the slightly glandular-hairy inflorescence. *Stem* branched; branches leafy, 6–10 in., radiating from the base of the scape, creeping and floating, as thick as a goosequill, succulent; joints not inflated. *Leaves* 1–2 in., imperfectly whorled; segments slender, linear, acute. *Scape* 1–2 ft., stout, erect. *Whorls* 4–8-flowered; pedicels ½–1½ in., decurved in fruit; bracts linear. *Calyx-lobes* ⅛ in., linear. *Corolla* ¾ in. diam., lilac with a yellow eye; lobes obtuse. *Capsule* the size of a small pea.—DISTRIB. Europe, excl. Spain Greece and Turkey, W. Siberia.

8. SA'MOLUS, *Tournef.* BROOK-WEED.

Annual or perennial herbs. *Leaves* alternate or mostly radical. *Flowers* in terminal racemes or corymbs, white; pedicels bracteate. *Calyx* ½-superior, limb 5-fid. *Corolla* perigynous; subcampanulate, 5-partite. *Stamens* 5, on the tube of throat of the corolla, alternating with staminodes, filaments very short. *Ovary* subglobose; style short, stigma obtuse or capitate; ovules many, anatropous. *Capsule* ½-inferior, ovoid, 5-valved above the calyx-tube, many-seeded. *Seeds* angular, hilum basilar.—DISTRIB. Temp. climates; species about 10.—ETYM. obscure.

1. **S. Valeran'di,** *L.*; leaves obovate or spathulate obtuse or apiculate. Wet ground and ditches, often near the sea, from Skye and Moray southwards; fl. June–Sept.—Glabrous, rather shining. *Rootstock* short. *Stem* ½–2 ft., erect, with prostrate or ascending sometimes rooting branches from the base. *Leaves* 1–4 in., quite entire, radical rosulate, cauline alternate. *Racemes* ½–¾ in., erect; pedicels ascending, bract above their middle small lanceolate. *Calyx-tube* hemispherical; lobes deltoid, acute. *Corolla* ⅛ in. diam., lobes short, obtuse. *Stamens* included. *Capsule* ¼ in. diam., globose. *Seeds* rough.—DISTRIB. Temp. N. hemisphere.

ORDER LIX. PLUMBAGIN'EÆ.

Herbs, often maritime, rarely shrubs. *Leaves* alternate or radical, exstipulate. *Flowers* regular, 2-sexual; bracteoles and bracts usually 3. *Calyx* inferior, tubular; limb 5-cleft, plaited, often scarious and coloured. *Petals* 5, hypogynous, claws long free or slightly cohering, twisted in bud, or combined into a monopetalous imbricate corolla. *Stamens* 5, opposite the corolla-lobes, epipetalous (hypogynous in the monopetalous genera), filaments filiform; anther-cells bursting inwards, separate below. *Ovary* free, 1-celled; styles 5, rarely 3–4, distinct or cohering, stigmas capillary or linear; ovule solitary, anatropous, suspended from a basal funicle. *Fruit* enclosed in the calyx-tube, membranous, bursting irregularly or 5-valved. *Seed* pendulous, albumen scanty floury; embryo straight, cotyledons flat, radicle cylindric superior.—DISTRIB. All regions; genera 10; species about 200.—AFFINITIES. Nearest to *Primulaceæ*, but distant.—PROPERTIES. Astringent, but unimportant.

Scape terminated by a bracteate head.....1. Armeria.
Scape terminated by panicled unilateral cymes.....2. Statice.

1. ARME'RIA, *Willd.* THRIFT, SEA-PINK.

Perennial herbs. *Leaves* all radical, very narrow. *Flowers* pedicelled, fascicled in small bracteate cymes, which are collected into a dense hemispheric head; involucre tubular, scarious, reverted, sheathing the top of the scape downwards. *Calyx* funnel-shaped, scarious. *Petals* cohering at the very base, persistent and covering the utricle. *Filaments* inserted on the petals, bases dilated. *Ovary* obovoid; stigmas capillary, papillose. *Utricle* with 5 hard bosses at the top, dehiscing transversely or irregularly below.—DISTRIB. Alpine, Arctic and maritime N. temp. regions, Chili; species 30.—ETYM. The monkish Latin *Flos Armeriæ*, applied to a Pink.

1. **A. vulga'ris,** *Willd.*; pubescent or villose, leaves linear usually 1-nerved. *A. maritima*, and *alpina*, Willd.; *A. pubescens*, Link; *A. pubigera*, β *scotica*, Boissier; *A. duriuscula*, Bab.; *Statice Armeria*, L.

Rocky and stony sea-shores and on lofty mountains, ascending to 3,800 ft. in the Highlands; fl. April–Oct.—*Rootstock* woody, branched. *Leaves* densely fascicled, 1–6 in., $\frac{1}{16}$–$\frac{1}{8}$ broad, obtuse or acute, covered with impressed points on both surfaces. *Scape* 3–12 in., hairs spreading or reflexed; heads $\frac{1}{2}$–1 in. diam.; involucral (reverted) bract $\frac{1}{4}$–1 in., lacerate; outer bracts shorter than the head, ovate, acute or produced into long brown or green points; inner oblong, obtuse, scarious; pedicel $\frac{1}{4}$–$\frac{1}{2}$ in., equalling the calyx. *Calyx* decurrent on the pedicel, with 5 pubescent ribs, lobes cuspidate. *Petals* $\frac{1}{4}$ in., rose-pink or white, limb obovate. *Utricle* exceeding the calyx-tube.—DISTRIB. Europe (Arctic), Asia, N. America, Chili.

VAR. *planifo'lia*, Syme; leaves broader, flat above, sometimes 3-nerved.

2. **A. plantagin'ea,** *Willd.*; glabrous, leaves narrow-lanceolate usually 3–5-nerved, calyx-lobes awned.

Sandy banks, &c., St. Brelade's Bay and on the Quenvais, Jersey; fl. June–Aug.—More rigid, stouter and larger than *A. vulgaris;* leaves $\frac{1}{16}$–$\frac{1}{4}$ in. broad, narrowed into long points, margins cartilaginous and undulate when dry; scapes taller; reverted involucral bracts longer and less deeply cut; outer bracts with usually a long herbaceous point exceeding the head; flowers darker, on shorter pedicels.—DISTRIB. Mid. and S. Europe.—Syme describes a probable hybrid between this and *A. vulgaris*, as growing with them at St. Brelade's Bay.

2. STAT'ICE, *L.* SEA-LAVENDER.

Perennial herbs. *Leaves* all radical. *Flowers* shortly pedicelled, in 1- or more-flowered 3-bracteate spikelets, which are alternately distichously or secundly arranged in branched panicles. *Calyx* obconic; limb scarious, 5-lobed. *Petals* free or united at the very base. *Filaments* inserted on the petals. *Ovary* obovoid or oblong; styles free or connate at the base, stigmas capillary, papillose. *Fruit* as in *Armeria*.—DISTRIB. Chiefly saline districts and shores of temp. seas, most common in W. Asia; species 50–60.—ETYM. The Greek name for some *astringent* herb.

* *Leaves pinnately-veined. Calyx-lobes with intermediate teeth.*

1. **S. Limo'nium,** *L.*; leaves usually long-petioled 1-ribbed, scape branched above, branches nearly all flowering.

Muddy shores, from Holy Is. on the E. and Wigton on the W. southwards; and in Ireland; fl. July–Nov.—Glabrous. *Rootstock* stout, woody, creeping,

branched. *Leaves* 2–4 in., oblong- or obovate-lanceolate, variable in breadth, often mucronate, petiole usually slender. *Scapes* many, 6–18 in., angular, corymbosely branched. *Spikelets* 2–3-flowered, ⅓ in., alternate, erect, secund; outer bract herbaceous margins scarious, intermediate scarious, inner scarious and green at the back. *Calyx* purplish-green; lobes triangular-ovate, often jagged, much enlarged after flowering. *Corolla* ½ in., blue-purple.—DISTRIB. Europe, N. Africa, N. America.

Sub-sp. LIMO'NIUM proper; inner bract about twice as long as the intermediate.—Absent from Ireland.—VAR. 1, *Behen*, Drejer (sp.); spikelets on corymbose compact or spreading or recurved branches.—VAR. 2, *serotina*, Gren. and Godr. (sp.); spikelets in pyramidal panicles with flexuous spreading branches. S. coast of England.

Sub-sp. BAHU'SIENSIS, *Fries* (sp.); spikelets lax on distant erect or incurved branches, inner bract half as long as the intermediate. *S. rariflora*, Drejer.

** *Leaves* 1–3-*nerved*: *Calyx-lobes without intermediate teeth.*

2. **S. auriculæfo'lia,** *Vahl;* leaves shortly petioled 3-nerved at the base, scape branched from about the middle, branches nearly all flowering, calyx-lobes obtuse.—*S. spathulata*, Hook.; *S. binervosa*, G. E. Sm.

Sea-shores from Lincoln on the E. and Galloway on the W. southwards; common in Ireland; fl. July–Aug.—Glabrous. *Rootstock* short, stout, branched. *Leaves* 1–4 in., often mucronate. *Scapes* 4–10 in., paniculately branched; spikelets unilateral, often imbricate; bracts often coloured, inner twice as long as the intermediate; flowers as in *S. Limonium*. *Calyx-limb* white. *Corolla* blue-purple.—DISTRIB. Coasts of France, Spain, and the Mediterranean.—Boissier (who has examined Vahl's plant) refers this (in *Herb. Hook.*) to *auriculæfolia*, and in DC. *Prodr.* he refers the latter to his *oxylepis*.

VAR. 1, *occidenta'lis*, Lloyd (sp.); leaves obovate-lanceolate, branches of panicle ascending, lower sometimes flowerless, spikelets slender erect or ascending.—VAR. 2, *interme'dia*, Syme; leaves obovate-lanceolate, branches of panicle ascending usually all flowering, spikelets stout spreading or ascending.—VAR. 3, *Dodar'tii*, Gir.; leaves spathulate, branches of panicle short spreading often in pairs all flowering, spikelets crowded stout spreading.

3. **S. reticula'ta,** *L.*; leaves shortly petioled 1-ribbed, scape branched from near the base, branches flexuous most of them flowerless, calyx-lobes mucronate. *S. bellidifolia*, Gouan; *S. caspia*, Willd.

Salt marshes of the Wash (Norfolk, Cambridge, Lincoln); fl. July–Aug.—Glabrous, except the scaberulous panicle. *Rootstock* much branched. *Leaves* ¾–1½ in., few, obtuse. *Scape* 4–8 in., rather slender, excessively branched; branches spreading, recurved; spikelets unilateral, usually fascicled at the ends of the branchlets, bracts with broad scarious margins, inner ¼ longer than the intermediate; flowers much smaller than in *S. Limonium*, ¼ in., pale lilac.—DISTRIB. Coasts of France, the Mediterranean and Black Seas, E. Asia.—This I take to be the *Limonium reticulatum* of Ray and Bocconi, who are Linnæus' principal authorities for *S. reticulata*.

DIVISION III. APET'ALÆ.

ORDER LX. **POLYGONE'Æ.**

Herbs rarely shrubby. *Leaves* alternate, simple, quite entire or serrulate; margins revolute in bud; petiole dilated; stipule sheathing, scarious. *Flowers* usually 2-sexual, pedicels jointed. *Sepals* 3–6, petaloid or herbaceous, free or connate, persistent, imbricate in bud. *Stamens* 5–8, rarely more or less, perigynous or hypogynous, opposite the sepals; anthers 2-celled, bursting outwards or inwards. *Disk* glandular annular or 0. *Ovary* free, ovoid, 3-gonous or compressed; styles 1–3, stigmas capitate or penicillate; ovule 1, basilar, orthotropous. *Fruit* indehiscent, hard, usually enveloped in the perianth. *Seed* erect, testa membranous, albumen floury; embryo straight and axile, or lateral and curved, cotyledons various, radicle superior.—DISTRIB. Chiefly temp. regions; genera 33; species about 500.—AFFINITIES. With *Amaranthaceæ* and *Chenopodieæ*.—PROPERTIES. Root often astringent or purgative; some yield oxalic and malic acids; the leaves or seeds of others are alimentary.

Sepals 5, subequal. Fruit compressed or 3-gonous, wingless...1. Polygonum.
Sepals 6, 3 inner much larger. Fruit 3-gonous.....2. Rumex.
Sepals 4, 2 inner larger. Fruit winged.....3. Oxyria.

1. **POLYG'ONUM,** *L.*

Herbs. *Leaves* alternate; stipules tubular. *Flowers* 2-sexual, in panicled racemed or spiked clusters; bracts ochreate. *Sepals* 5, 3 outer sometimes enlarging in fruit. *Disk* usually glandular. *Stamens* 5–8; anthers versatile. *Ovary* compressed or 3-gonous; styles 2–3, stigmas capitate. *Fruit* 3-quetrous or compressed. *Embryo* axile or lateral.—DISTRIB. All climates; species 150.—ETYM. πολύς and γόνυ, from the *many nodes*.

SECTION 1. **Bistor'ta,** *Tournef. Rootstock* perennial. *Stem* simple, erect. *Stipules* truncate. *Racemes* solitary, spike-like; pedicels jointed at the top. *Stamens* 8. *Fruit* 3-quetrous; embryo lateral, cotyledons thin flat.

1. **P. Bistor'ta,** *L.*; leaves obtuse or cordate at the base, petiole winged, raceme dense cylindric. *Bistort, Snake-root.*

Woods and wet meadows, from Ross and Skye southwards, but not common, and often introduced; ascends to 1,000 ft. in Northumberland; very rare and probably not native in Ireland; fl. June-Sept.—Glabrous, except the leaf-nerves beneath. *Rootstock* woody, twisted, creeping; roots tuberous. *Stems* 1–2 ft., strict, slender. *Leaves*, radical 3–6 in., oblong-ovate, obtuse, waved, glaucous beneath; petioles 6–12 in., broadly winged above; cauline subsessile, broader at the base; stipules ½–3 in. *Spike* 1½–2 in.; bracts cuspidate. *Sepals* ⅛ in., pink. *Stamens* exserted. *Fruit* brown, shining.—DISTRIB. Europe (Arctic), N. Asia, W. Asia to the Himalaya.—Root astringent and starchy; used as food in famine-times, and formerly medicinally.

2. **P. vivip'arum,** *L.*; leaves narrowed at the base, petiole not winged, raceme spike-like bulbiferous below.

Mountain pastures and wet alpine rocks; ascending to 4,000 ft. in Scotland; N.W. of Ireland, very rare; fl. June–Aug.—Glabrous. *Rootstock* slender. *Stem* 4–16 in., slender. *Leaves* 1–2½ in., ⅛–⅓ in. broad, radical narrow linear-oblong, petioles as long or shorter, subacute, glaucous beneath, margins revolute; cauline few, shorter petioled; stipules ½–1½ in. *Spikes* 1–3 in., slender, obtuse. *Flowers* whitish or pink, as in *P. Bistorta,* but rather smaller; bulbils purple. *Fruit* rarely ripening.—DISTRIB. Alps of N. temp. and high Arctic regions.

SECTION 2. **Persica'ria,** *Meissn.* Annual, rarely perennial. *Stipules* truncate, entire. *Racemes* spike-like, solitary in pairs or panicled; pedicels jointed at the top. *Stamens* 4–8. *Fruit* compressed or 3-quetrous; embryo lateral, cotyledons thin, flat.

* *Spikes short, usually dense, not or rarely interrupted, not leafy at the base.*

3. **P. amphib'ium,** *L.*; perennial, creeping or floating, spikes dense, peduncles hairy, sepals eglandular, stamens 5, styles 2 united half-way, fruit ovoid, faces convex.

Damp and watery places; fl. July–Aug.—*Rootstock* creeping, slender, woody, branched. *Stem* very variable in length and height. *Leaves* oblong linear-oblong or lanceolate, obtuse or acute, serrulate or ciliate, eglandular, petioled or not; stipules large, appressed, mouth entire. *Spikes* 1–3, ½–2 in.; peduncles stout, hairy; pedicels short; bracts obtuse acute or cuspidate. *Sepals* ⅛ in., not nerved, pale or bright rose-red, much longer than the shining fruit.—DISTRIB. N. temp. and Arctic regions.

VAR. 1, *aquat'icum;* leaves floating long petioled, like those of *Potamogeton natans,* and stipules glabrous.—VAR. 2, *terres'tre;* terrestrial, leaves shortly petioled or sessile longer and narrower, and stipules scabrid or hispid.

4. **P. lapathifo'lium,** *L.*; annual, spikes subcylindric, peduncle rough sepals glandular, stamens 6, styles 2 free, fruit orbicular, faces concave.

Fields and waste places; ascends to near 1,000 ft. in Yorkshire; fl. July–Aug. —*Stem* 1–4 ft., decumbent and rooting below, much branched; nodes stout, swollen. *Leaves* 4–6 in., shortly petioled, ovate- or oblong-lanceolate, acuminate, ciliate, glabrous pubescent scaberulous or cottony above and below, sometimes glaucous below, or with a black blotch above, punctate and sparingly glandular; stipules loose, often ciliate. *Spikes* 1–3, ¾–1½ in., often racemed or panicled, obtuse, stout; bracts broad, obtuse or cuspidate. *Sepals* nerved, equalling the obtuse dark fruit.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, W. Asia to India; introd. in America.

VAR. 1, *lapathifo'lium* proper; upper stipules obliquely truncate ciliate, lower naked, spikes dense remote when young, sepals greenish-white.—VAR. 2, *nodo'sum,* Pers. (sp.); stipules all ciliate, upper strongly, spikes drooping crowded when young, sepals pink, fruit smaller. *P. laxum,* Reich. Rare.

5. **P. Persica'ria,** *L.*; annual, spikes usually short dense, peduncle glabrous sepals nearly eglandular, stamens 6, styles 2–3 united half-way, fruit plano-convex or 3-gonous. *Persicaria.*

Waste moist places, fields, &c.; ascending to 1,200 ft. in the N. of England; fl. July–Oct.—*Stem* 6–18 in., branched, erect or ascending, nodes swollen. *Leaves* subsessile, ovate or lanceolate, subacute, ciliolate, often with a black

blotch, pubescent and punctate below, eglandular; stipules copiously ciliate. *Spikes* ½–1½ in., stout, with sometimes a leaf at the base, erect or suberect, peduncled, lateral sessile. *Sepals* red or white, equalling the fruit.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria, W. Asia to India.

** *Spikes long, lax, slender, interrupted and leafy below.*

6. **P. mi'te,** *Schrank;* annual, suberect, spikes slender erect, sepals eglandular, stamens 5–6, styles 2–3 united half-way, fruit plano-convex or 3-gonous as long as the sepals.

Wet places, from York southwards, local; fl. Aug.–Sept.—*Stems* 1–2 ft., erect, decumbent at the rooting base, branched, slender. *Leaves* 2–4 in., shortly petioled, lanceolate or elliptic-lanceolate, subacute, ciliolate, eglandular; stipules loose, strongly ciliate. *Spikes* ½–3 in., solitary, lax. *Sepals* white or pink, nerves faint. *Fruit* black, rather narrow.—DISTRIB. Europe, except Spain Greece and Turkey.

7. **P. Hydrop'iper,** *L.*; annual, suberect, spikes very slender tips drooping, sepals with few very large glands, stamens 6 (rarely 8), styles 2–3 free, fruit plano-convex or 3-gonous as long as the sepals. *Water-pepper.*

Watery places, from Skye southwards, and in Ireland; ascending to 1,300 ft. in the Lake district; fl. Aug.–Sept.—*Stem* 1–3 ft., creeping and rooting at the base, much branched. *Leaves* 2–4 in., shortly petioled, lanceolate or elliptic-lanceolate, subacute, ciliolate, minutely glandular below; stipules short, inflated, ciliate or not. *Spikes* 3–8 in., curved, lax. *Sepals* green and rose-coloured. *Fruit* black, punctulate.—DISTRIB. N. temp. hemisphere.—Very acrid, and a reputed diuretic.

8. **P. mi'nus,** *Huds.*; annual, spikes very slender straight, sepals usually 5 with minute glands at the base only, styles 2–3 united half-way, fruit plano-convex or 3-gonous as long as the sepals.

Marshy places, local in England, Dumfriesshire only in Scotland; rare in Ireland; fl. Aug.–Sept.—*Stem* 6–24 in., usually very slender, much branched, erect or ascending. *Leaves* 1–3 in., narrow-lanceolate, ciliolate, eglandular; stipules not inflated, short, ciliate. *Spikes* 1–3 in., solitary or panicled, usually on slender peduncles. *Sepals* ⅛–¼ in., very small. *Fruit* pitchy-black, shining, acute.—DISTRIB. Europe, Siberia, W. Asia to India.

SECTION 3. **Avicula'ria,** *Meissn.* Annual or biennial. *Leaves* narrow; stipules silvery, at length lacerate. *Flowers* axillary, solitary or fascicled; pedicels jointed at the top. *Stamens* usually 8. *Styles* usually 3. *Fruit* 3-quetrous; embryo lateral, cotyledons thin flat.

9. **P. Avicula're,** *L.*; prostrate, nerves of leaves obscure beneath, of the stipules few simple, sepals enclosing the fruit. *Knotgrass.*

Fields, waste places, &c.; ascending to 1,800 ft. in Northumberland; fl. May–Oct. — Annual, glabrous, eglandular, branched from the base; branches ½–3 ft., straggling, grooved, angular above, leafing and flowering throughout. *Leaves* ½–1½ in., ⅛–¼ in. broad, sessile or shortly petioled, linear-lanceolate or -oblong, narrowed at both ends, rarely broadly elliptic or almost filiform, acute or obtuse, margins flat or recurved; stipules ⅛–¼ in., white, red at the base, lacerate to the middle. *Flowers* ⅛–⅛ in., white, pink, crimson, or green, clustered in the axils of most of the leaves. *Fruit* brown, minutely striate and punctate.—DISTRIB. Europe (Arctic), N. and W. Asia; introd. in N. America.—A most variable plant.

VAR. 1, *vulga'tum;* leaves rather thin, fruit dull not exceeding the sepals.—VAR. 2, *littora'le,* Link. (sp.); leaves rather fleshy, fruit more shining slightly exceeding the sepals. Littoral. The passage to *P. maritimum.*

10. **P. marit'imum,** *L.*; prostrate, nerves of the leaves reticulate beneath, of the stipules few or many, sepals shorter than the fruit.

Sea-shores, from Forfar and the Clyde southwards; fl. July–Sept.—Very similar to *P. aviculare,* but perennial, much stouter, more rigid and woody, colour darker when dry; leaves thicker, margins recurved, often glaucous below; stipules larger more scarious and nerved; flowers and fruit much larger.—DISTRIB. France, Spain, the Mediterranean, W. Asia, N. America.

Sub-sp. MARIT'IMUM proper; leaves usually spreading fleshy glaucous beneath, margins revolute, stipules with many often-forked nerves, sepals broader.—Channel Is., Hampshire (probably extinct).

Sub-sp. RA'II, Bab. (sp.); upper leaves usually erect not fleshy or glaucous beneath, margins flat, stipules with few simple nerves. *P. Roberti,* Loisel. in part.—Habit and foliage of *P. aviculare,* fruit of *P. maritimum.*

SECTION 4. **Tinia'ria,** *Meissn.* Annual (the British species), usually twining. *Leaves* cordate or sagittate; stipules truncate, mouth entire. *Flowers* in racemose clusters. *Sepals* enlarging. *Stamens* 8. *Styles* 3, united. *Fruit* 3-quetrous; embryo lateral, cotyledons narrow, flat.

11. **P. Convolvulus,** *L.*; leaves cordate-sagittate, 3 outer sepals obtusely keeled rarely winged, pedicels short jointed above the middle, fruit dull striate granulate. *Black Bindweed.*

Fields and waste places, ascending to upwards of 1,000 ft. in the Highlands; fl. July–Sept.—*Root* fibrous. *Stem* 1–4 ft., angular, twining, climbing or prostrate, slender, puberulous at the angles. *Leaves* 1½–4 in., petioles shorter slender, gradually acuminate, lateral angles obtuse or acute, eglandular, puberulous beneath; stipules short. *Racemes* erect, terminal and axillary, slender, pedicels recurved. *Sepals* 5, obtuse, green, margins white, 3 outer rough at the back, at length ¼ in. and covering the fruit.—DISTRIB. N. temp. and Arctic regions of the Old World; introd. in the New.

VAR. 1, *Convolvulus* proper; clusters 4–6-flowered, outer sepals obtusely keeled in fruit.—VAR. 2, *pseudo-dumeto'rum,* Wats.; clusters 5–10-flowered, flowers fewer, outer sepals broadly winged in fruit.

12. **P. dumeto'rum,** *L.*; leaves cordate-sagittate, 3 outer sepals with broad membranous wings, pedicels very slender jointed below the middle, fruit smooth highly polished.

Hedges and thickets in the S. counties of England, from Monmouth to Herts southwards, rare, soon disappearing; fl. July–Aug.—Habit of *P. Convolvulus,* but pedicels capillary (often ¼ in.) and seed polished. The stems are described as terete, but I find them as much angled as in *P. Convolvulus.*—DISTRIB. Europe, Siberia, W. Asia to N.W. India.

2. RUMEX, *L.* DOCK.

Herbs. *Rootstock* stout, tapering into the root; biennial or perennial. *Stems* usually grooved. *Leaves* alternate; stipules tubular. *Flowers* 1-2-sexual, in panicled or racemed whorls. *Sepals* 6, 3 inner enlarging. *Stamens* 6; anthers basifixed, erect. *Ovary* 3-quetrous; styles 3, filiform, stigmas penicillate. *Fruit* 3-quetrous. *Embryo* lateral.—DISTRIB. All temp. climates; species about 50.—ETYM. The old Latin name.

SECTION 1. **Lap'athum,** *Meissn. Leaves* not hastate. *Flowers* 2-sexual (monœcious in *R. alpinus*). *Inner sepals* coriaceous in fruit.

* Inner fruiting sepals strongly toothed.

1. **R. obtusifo'lius,** *L.*; radical leaves oblong-ovate cordate obtuse, panicle leafy below, inner fruiting sepals elongate triangular obtuse shortly strongly toothed at the base, upper with an ovoid tubercle.

Fields, waste grounds, &c.; ascends to 1,600 ft. in N. of England; fl. Aug.-Sept.—Perennial, 2-3 ft., stem stout and leaves beneath puberulous. *Leaves* 6-12 in., subacute or obtuse, margin crenulate waved, upper oblong-lanceolate; petiole rather slender. *Panicle* narrow; pedicels ½-twice as long as the reticulate fruiting sepals, ½-¾ in.; tubercle red.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America.

2. **R. acu'tus,** *L.*; radical leaves linear or oblong-lanceolate waved, panicle leafy below, inner fruiting sepals triangular or cordate with short broad teeth near the top, upper with an ovoid or lanceolate tubercle. *R. pratensis,* Mert. and Koch.

Roadsides and waste places from Aberdeen southwards; ascending to 1,200 ft. in N. of England; fl. June-July.—Similar to *R. obtusifolius,* but leaves narrower, and fruiting inner sepals much broader, with more and shorter teeth.—Syme, following Koch, is disposed to regard this as a hybrid between *R. crispus* and *obtusifolius. R. conspersus,* Hartm., which has more crisped leaves, otherwise agrees with this; it was found in Kinross-shire by Dr. Walker Arnott, who suspected it to be a hybrid between *R. obtusifolius* and *aquaticus.*—DISTRIB. Europe from the Alps northwards, Spain.

3. **R. pul'cher,** *L.*; leaves oblong-cordate or fiddle-shaped obtuse, upper acute, panicle leafy to the top, inner fruiting sepals oblong deeply-toothed to above the middle, tubercle oblong often muricate. *Fiddle Dock.*

Roadsides and waste places in dry soil from Notts and Lincoln southwards; fl. June-Oct.—Biennial or perennial, glabrous or sparingly pubescent. *Stem* 6-24 in., flexuous; branches slender, spreading, tips often decurved. *Leaves* 3-6 in., soon withering, always contracted above the base, crenulate; petiole slender. *Panicle* with spreading branches and remote whorls; pedicels stout, shorter than the fruiting sepals, jointed below the middle. *Fruiting sepals* ¼ in., pale, obtuse truncate or cuneate at the base, deeply pitted and reticulate; teeth short, straight. *Fruit* 1/10 in.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia.

4. **R. marit'imus,** *L.*; leaves linear- or oblong-lanceolate, panicle leafy to the top, inner fruiting sepals triangular or rhomboid acuminate, teeth 2-4 very long, tubercle linear-oblong very tumid. *Golden Dock.*

Marshes, &c. rare, from Durham southwards; Co. Dublin in Ireland; fl. July-Aug.—Biennial, puberulous, yellow-green. *Stem* 1-2 ft.; branches ascending. *Leaves* 3-10 in., acute obtuse or cuneate at the base, shortly petioled, margins slightly waved. *Panicle* with spreading densely flowering branches, whorls often confluent; pedicels jointed close to the base, very variable in length, rarely twice as long as the fruiting sepals, which are reticulate, 1/10-⅛ in., orange-yellow, spines as long; tubercle often almost concealing the sepal. *Fruit* small, pale chesnut.—DISTRIB. Europe, Siberia, Dahuria, W. Asia to N.W. India, N. America.

Sub-sp. MARIT'IMUS proper; whorls confluent, inner fruiting sepals triangular, teeth often longer than the sepal.

Sub-sp. PALUS'TRIS, *Sm.* (sp.); whorls laxer usually distinct fewer-flowered, inner fruit-bearing sepals oblong-triangular or rhomboid, teeth shorter usually fewer.

** Inner sepals quite entire or minutely toothed.

† *One or all the inner sepals with a prominent tubercle on the midrib.*

5. **R. cris'pus,** *L.*; leaves lanceolate or oblong-lanceolate subacute much waved and crisped, panicle leafy below, inner fruiting sepals broadly ovate or cordate obtuse subentire, upper with a broad smooth tubercle.

Roadsides and waste places; ascends to near 2,000 ft. in Northumberland; fl. June–Oct.—Perennial, glabrous or puberulous. *Stem* 1–3 ft., branched. *Leaves* 6–10 in., obtuse rounded or acute at the base; petiole moderate. *Panicle* with erect branches; whorls crowded; pedicels jointed at the base, twice as long as the fruiting sepals or shorter. *Fruiting sepals* ½–¾ in., green or reddish, reticulate; inner entire or crenulate; tubercle small, smooth. *Fruit* brown.—DISTRIB. Europe, N. Africa, temp. Asia to Japan; introd. in N. America.

6. **R. sanguin'eus,** *L.*; leaves oblong-lanceolate fiddle-shaped sparingly waved, panicle leafy at the base, inner fruiting sepals oblong obtuse rounded at the base entire, upper with a large smooth tubercle.

Roadsides and hedges from Isla and Elgin southwards; ascending to 1,200 ft. in Yorkshire; fl. July–Aug.—Perennial, glabrous. *Stem* 1–4 ft., slender, simple or sparingly branched. *Leaves* 6–10 in., usually cordate at the base and contracted above it, margin slightly waved; petiole shorter. *Panicle* lax, usually leafless; whorls distant, many-flowered; pedicels usually equalling the fruiting sepals, rarely twice as long, jointed at the base. *Fruiting sepals* oblong or oblong-lanceolate; tubercle on the outer larger, subglobose, on the others small or 0. *Fruit* brown, shining.—DISTRIB. Europe, W. Asia; introd. in N. America.

VAR. 1, *sanguin'eus* proper; stem and veins of leaves blood-red. Rare, often naturalized.—VAR. 2, *vir'idis,* Sibth. (sp.); stem and veins of leaves green or red in autumn only. *R. nemorosus,* Schrader.

7. **R. conglom'eratus,** *Murray;* leaves oblong-lanceolate rounded or cordate at the base, panicle leafy almost to the top, inner fruiting sepals linear-oblong subacute rounded at the base quite entire, all with oblong tubercles. *R. acutus,* Sm. and L. Herb.

Wet meadows and waste places; fl. June–Oct.—Closely allied to *R. sanguineus,* differing in the leaves never contracted above the base, pedicels jointed below the middle, longer tubercles, and in the characters given above.—DISTRIB. Europe, N. Africa, W. Asia, introd. in N. America.

8. **R. Hydrolap'athum,** *Huds.*; leaves broadly oblong-lanceolate, panicle almost leafless, inner fruiting sepals deltoid-ovate acute or obtuse quite entire or faintly toothed, all with oblong tubercles.

Ditches and river-sides from Isla southwards; common in England, rare in Scotland and Ireland; fl. July–Aug.—Perennial, glabrous. *Stem* 3–6 ft., erect, branched. *Leaves* 1–2 ft., acute, rounded cordate or acute at the base, margins flat crenulate; petiole 6–10 in., flat above, not winged. *Panicle* very large; whorls rather crowded; fruiting pedicels as long or twice as long as the sepals, jointed towards the base. *Fruiting sepals* ½–⅔ in., reticulate, truncate or cuneate at the base. *Fruit* pale chestnut. —DISTRIB. Europe.—The largest British species. Root astringent.

†† *Fruiting sepals without tubercles on the midrib.*

9. **R. aquat'icus,** *L.*; lower leaves oblong-lanceolate crisped and waved, panicle leafy at the base only, inner fruiting sepals cordate waved membranous reticulate. *R. domesticus,* Hartman; *R. longifolius,* DC.

Fields, meadows, and ditches, from Yorkshire and Westmoreland northwards; ascending to 1,600 ft. in the Highlands; absent from Ireland; fl. July–Aug. —Perennial, glabrous. *Stem* 1–3 ft., very stout. *Leaves* as in *R. crispus,* but broader, 3–4 in. across. *Panicles* with erect branches; whorls confluent; pedicels usually the length of the sepals, jointed below the middle. *Fruiting sepals* ½–¾ in. diam., obtuse, green, strongly reticulate; midrib slightly thickened. *Fruit* broad, small, pale brown.—DISTRIB. Scandinavia (Arctic), France, Germany, N. Asia, W. Asia to the Himalaya, N. America.

R. ALPI'NUS, *L.*; leaves broadly ovate-cordate obtuse, panicle leafy at the base only, inner fruiting sepals triangular-ovate obtuse faintly reticulate. *Monk's Rhubarb.*

Roadsides, near cottages, &c. N. of England and Scotland, rare and naturalized only; fl. July–Aug.—Perennial, puberulous with cellular hairs. *Rootstock* very stout. *Stem* 2–4 ft., stout. *Leaves* 6–24 in., not so broad, margins waved; petiole long, stout. *Panicle* with very many erect branches; whorls very many, not confluent, flowers monœcious, pedicels jointed below the middle, usually twice as long as the fruiting sepals, which are ⅛–¼ in. *Fruit* grey.—DISTRIB. N. and Alpine districts of S. Europe, excluding Russia.—Root formerly used medicinally, and leaves as a potherb.

SECTION 2. **Aceto'sa,** *Tournef.* *Leaves* hastate or sagittate. *Flowers* monœcious or dicœcious.

10. **R. Aceto'sa,** *L.*; dicœcious, lower leaves sagittate, upper sessile, outer fruiting sepals reflexed, inner enlarged orbicular quite entire scarious tubercled at the base. *Sorrel.*

Meadows and pastures, ascending to 4,000 ft.; fl. May–Aug.—Perennial, glabrous, acid, rather succulent. *Rootstock* tufted, slender. *Stem* 1–2 ft., simple, slender. *Leaves,* radical 3–6 in., very long-petioled, basal sinus rounded or angled, glaucous beneath; stipules brown. *Panicle* with erect branches, leafless; male whorls densely 4–8-flowered; pedicels jointed below the middle. *Sepals* of male fl. herbaceous, margins white or pink, scarious; of female ⅛ in. in fruit, pink or crimson. *Fruit* brown, shining.—DISTRIB. N. temp. and Arctic zones.—Leaves used as a salad and potherb; abounds in binoxalate of potash.

11. **R. Acetosel'la,** *L.*; dicœcious, lower leaves hastate, uppermost sessile, outer fruiting sepals appressed, inner hardly enlarged oblong-ovate obtuse entire herbaceous, midrib thickened at the base. *Sheep's Sorrel.*

Dry pastures, &c., ascending to 2,500 ft. in Yorkshire; fl. May–Aug.—Perennial, acid, glabrous, often bright red in autumn. *Rootstock* creeping, much branched. *Stems* 3–20 in., often many and tufted, decumbent at the base, slender. *Leaves* ½–2 in., long-petioled, variable in breadth, often 3-lobed; stipules silvery, torn. *Panicle* leafless, branches erect; male flowers largest, pedicels as long as the fruiting sepals, jointed at the top, very variable in length. *Fruiting sepals* ⅛ in., closely investing the yellow-brown fruit.—DISTRIB. N. temp. and Arctic zones; introd. into the S.

3. OXY'RIA, *Hill.* MOUNTAIN SORREL.

Characters of *Rumex*, but sepals 4; anthers versatile; ovary compressed; stigmas 2; fruit lenticular, broadly winged, and embryo axile.—DISTRIB. Arctic regions and Alps of the N. temp. zone; species 1.—ETYM. *ὀξύς*, from the acidity of the leaves.

1. **O. renifor'mis,** *Hook.*; leaves ovate-cordate or reniform.

Mountain rocks and streams, Wales, Yorkshire, and northwards; ascending to near 4,000 ft. in the Highlands; S.W. of Ireland, rare; fl. July–Aug.—Perennial, glabrous, rather fleshy, acid. *Rootstock* branched, tufted. *Stem* 6–18 in., stout, subsimple. *Leaves*, radical many, ½–¾ in. broad, long-petioled, rounded or retuse, rarely 3-lobed or subhastate; cauline solitary. *Panicle* slender, leafless, lax-flowered; pedicels slender, jointed at the middle, thickened at the top. *Outer sepals* spreading or reflexed; inner ⅛ in., spathulate, 3–5-nerved. *Fruit* ⅛ in. diam.; wing orbicular-cordate, membranous, veined, top notched.—An excellent potherb and antiscorbutic.

ORDER LXI. AMARANTHA'CEÆ.

Herbs or shrubs. *Leaves* opposite or alternate, simple, usually quite entire, exstipulate. *Flowers* small, 1–2-sexual; bract persistent, bracteoles 2 deciduous. *Sepals* 3–5, subequal, scarious, persistent, imbricate in bud. *Petals* 0. *Stamens* 3–5, hypogynous, opposite the sepals, staminodes 3–5 or 0, filaments free or connate, filiform or dilated; anthers 1–2-celled, fixed by the back. *Ovary* free, 1-celled, compressed; style 0 or simple, stigmas 1–3 filiform or capitate; ovules 1 or more, basal, campylotropous. *Fruit* usually a membranous utricle. *Seeds* vertical, reniform, testa crustaceous shining, albumen floury; embryo annular or curved, radicle next the hilum.—DISTRIB. Tropics, rarely in temp. regions; genera 45; species about 400.—AFFINITIES. With *Chenopodiaceæ* and *Paronychieæ*.—PROPERTIES. Unimportant.

1*. *AMARAN'THUS, L.*

Herbs. *Leaves* alternate, apiculate. *Flowers* monœcious or polygamous, usually in cymose clusters. *Sepals* 3–5, equal, erect. *Stamens* 3–5, filaments free; staminodes 0; anthers 2-celled. *Style* 0, stigmas 2–3 subulate. *Utricle* ovoid. *Embryo* annular.—DISTRIB. Tropical or subtropical; species about 12.—ETYM. *ἀμάραντος, unfading*, from the persistent perianths.

A. BLI'TUM, *L.*; leaves ovate or obovate, flowers 3-merous.

Cultivated ground in the W. of London, &c., not even naturalized; fl. July–Aug.—Annual, glabrous. *Stem* 1–2 ft., decumbent, branched, angular. *Leaves* 1–3 in., long-petioled, dark green, tip rounded. *Flowers* minute; clusters axillary and in interrupted cymes. *Sepals* oblong, mucronate, exceeding the bracts, shorter than the utricle.—DISTRIB. Warm climates.

ORDER LXII. CHENOPODIA'CEÆ.

Herbs or shrubs. *Leaves* simple, alternate, exstipulate. *Flowers* 1–2-sexual, small, regular, often dimorphic; bracts 1–3 or 0. *Calyx* inferior, of 3–5 free or connate sepals, imbricate in bud. *Petals* 0. *Stamens* usually 5, opposite the sepals, perigynous or hypogynous;

anthers 2-celled. *Ovary* ovoid globose or depressed, 1-celled; stigmas 2–4; ovule solitary, basal or lateral, amphitropous. *Fruit* usually a utricle, enclosed in the often enlarged or fleshy calyx. *Seed* horizontal or vertical, testa crustaceous, inner coat membranous, albumen floury, rarely fleshy or 0; embryo curved annular or spiral.—DISTRIB. All climates; genera 70; species about 450.—AFFINITIES. With *Amaranthaceæ*, *Caryophyllcæ*, and *Paronychicæ*.—PROPERTIES. Chiefly known as potherbs.

TRIBE I. *Stem* leafy. *Albumen* copious, floury; embryo annular.
Flowers 2-sexual. Disk fleshy. Utricle thick and hard above.....1. Beta.
Flowers 2-sexual. Disk 0. Utricle membranous.....2. Chenopodium.
Flowers 1-sexual, male 3–5- female 2-sepalous.....3. Atriplex.

TRIBE II. *Stem* leafless, jointed. *Albumen* scanty; embryo conduplicate.
Flowers 2-sexual.....4. Salicornia.

TRIBE III. *Stem* leafy. *Albumen* scanty, fleshy; embryo spiral.
Sepals 4–5, not winged at the back.....5. Suæda.
Sepals 4–5, transversely winged in fruit.....6. Salsola.

1. BE'TA, *L.* BEET.

Herbs. *Leaves* almost entire. *Flowers* 2-sexual, in axillary spiked or cymose fascicles, cohering in fruit by the enlarged bases of the sepals. *Calyx* urceolate, base indurate in fruit. *Stamens* 5, perigynous, filaments subulate. *Disk* fleshy, annular. *Ovary* sunk in the disk, depressed; style short, stigmas 2–4 subulate. *Fruit* adnate to the disk and calyx-base. *Seed* horizontal, testa thin, albumen floury; embryo annular.—DISTRIB. N. temp. Europe and Asia; species 9.—ETYM. Uncertain.

1. **B. marit'ima,** *L.*; decumbent, clusters of flowers spiked.

Muddy, &c. sea-shores, from the Forth southwards, and in Ireland; fl. June–Oct.—Glabrous, perennial. *Rootstock* branched, tapering into a fleshy root. *Stems* many, 1–2 ft., branched, angular, striped, tips ascending. *Leaves* 2–4 in., fleshy, shining, lower rhomboid-ovoid, acute; upper lanceolate; petiole broad. *Spikes* 3–6 in., slender, panicled, clusters 2–3-flowered, sessile; bracts linear-lanceolate, acute, lower ½–1 in.; flowers ⅛ in. diam., green. *Sepals* incurved, obtuse, keel entire, edges scarious.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia to India.—Probably the origin of the Beet and Mangold Wurzel. An excellent spinach.

2. CHENOPO'DIUM, *Tournef.* GOOSE-FOOT.

Erect or prostrate, very variable herbs, usually littoral or on made soil. *Stem* angled, striped white or red and green. *Leaves* entire lobed or toothed. *Flowers* minute, 2-sexual, ebracteolate; clusters axillary, or in simple or panicled cymes. *Sepals* 3–5. *Stamens* 2–5, perigynous, filaments subulate. *Disk* 0. *Ovary* free, depressed or compressed; styles 2–3. *Utricle* membranous, often enclosed by the calyx. *Seed* horizontal or vertical, testa crustaceous, albumen floury; embryo annular.—DISTRIB. All climates; species about 50.—ETYM. χῆν and πούς, *goose-foot.*

SECTION 1. Annual. *Flowers* 5-merous. *Styles* short. *Seeds* horizontal.

* *Leaves quite entire.*

1. **C. Vulva'ria,** *L.*; mealy, diffuse, leaves deltoid-ovate, sepals not keeled covering the utricle. *C. olidum,* Curtis.

Roadsides and waste places, from Edinburgh southwards; rare in Scotland; S. and E. of Ireland (perhaps extinct); fl. Aug.-Oct.—Annual, fœtid. *Branches* 6–18 in., opposite, divaricate. *Leaves* ½–1 in., greasy to the touch, acute, grey-green; petioles as long or shorter. *Spikes* small, ¼–½ in., dense, axillary and terminal. *Seeds* black, punctulate.—DISTRIB. Europe from Denmark southwards, N. Africa.—Odour of stale salt fish.

2. **C. polysper'mum,** *L.*; glabrous, erect or ascending, leaves ovate, sepals not keeled shorter than the utricle.

Cultivated ground, manure-heaps, &c. from Lancashire and Durham southwards; Ireland, very rare and introduced only; fl. Aug.-Oct.—Annual. *Stem* 6–18 in.; branches many, spreading, leafy. *Leaves* ½–1½ in., shortly petioled, membranous. *Cymes* ½–1 in., axillary and terminal, simple or panicled; branches very slender, spreading; flowers very minute. *Seeds* minute, dark brown, rough.—DISTRIB. Europe, N. Asia; introd. in N. America.

VAR. 1, *acutifo'lium,* Sm. (sp.); stem ascending, leaves acute, cymes nearly simple leafy.—VAR. 2, *cymo'sum,* Moq. Tand.; stems decumbent, leaves more obtuse, cymes dichotomous leafless. Var. *obtusifolium,* Syme.

** *Leaves more or less toothed or lobed.*

3. **C. al'bum,** *L.*; erect, more or less mealy, leaves subentire or irregularly toothed, upper oblong entire, sepals keeled covering the utricle narrowly scarious or all green, seed obtusely keeled or not.

Waste places, especially in cultivated ground, ascending to near 1,000 ft. in Yorkshire; fl. July-Sept.—Very variable. *Stem* 1–3 ft.; branches erect or ascending. *Leaves* 1–3 in., rhombic deltoid-ovate or oblong, tip acute obtuse or rounded, base cuneate often 3-nerved; petiole usually long and slender. *Spikes* terminal and axillary, simple or panicled, leafy below. *Seed* almost black.—DISTRIB. Europe (Arctic), temp. Asia; introd. in N. America.

Sub-sp. AL'BUM proper; leaves rhombic or deltoid-ovate hardly hastate, seed obtusely keeled.—VAR. 1, *can'dicans,* Lamk. (sp.); leaves usually much toothed mealy, spikes simple shorter than the leaves in a slender terminal panicle, calyx very mealy.—VAR. 2, *vir'ide,* L. (sp.); leaves almost entire sparingly or hardly mealy, spikes lax axillary subcorymbose, branches recurved, calyx almost glabrous.—VAR. 3, *paga'num,* Reich. (sp.); lower leaves obtusely serrate glabrous or sparingly mealy below only, spikes lax erect axillary simple or in terminal panicles, calyx sparingly mealy. Var. *virens,* Lond. Cat.

Sub-sp. FICIFO'LIUM, *Sm.* (sp.); flaccid, leaves more oblong-hastate with broader obtuse spreading basal lobes, often contracted above them, spikes lax ascending panicled, seed not keeled.—From Northumberland southwards, Dublin and Belfast, rare.—Unlike any of the varieties of *album* proper; always easily recognized; it should perhaps be regarded as a species, but its distinctive characters are hardly to be conveyed by words.

4. **C. ur'bicum,** *L.*; erect, sparingly mealy, leaves triangular acute deeply toothed or subentire, spikes erect leafless simple axillary, or in a terminal erect panicle which is leafy below, sepals not keeled nor covering the utricle broadly scarious, seed large punctulate not keeled.

Waste places, from Chester and York southwards; not indigenous in Scotland; very rare in Ireland; fl. Sept.-Oct.—*Stem* 6–36 in., stout, sparingly branched. *Leaves* 1–3 in., often as broad as long; petiole usually shorter, winged above; lateral nerves spreading. *Spikes* ¾–2 in., rather dense-flowered.—DISTRIB. Europe, Canaries, Siberia, W. Asia; introd. in N. America.

VAR. 1, *deltoi'deum*, Lamk. (sp.); leaves deltoid shortly toothed or subentire, spikes erect longer than the leaves, panicle leafless above.—VAR. 2, *intermedium*, Mert. and Koch (sp.); leaves rhombic-triangular deeply sinuate-toothed, spikes shorter than the leaves, panicle leafy almost to the top.

5. **C. hyb'ridum,** *L.*; erect, almost glabrous, leaves large long-acuminate with 2–4 broad lobes on each side, spikes in lax axillary almost leafless corymbs, sepals obtusely keeled not covering the utricle broadly scarious, seed large opaque coarsely pitted not keeled.

Fields and waste places, from Northumberland to Dorset and Kent, local; rarer and not wild in Scotland and Ireland; a native? *Watson;* fl. Aug.–Sept.—Odour heavy. *Stem* 1–3 ft., stout, branched. *Leaves* 3–5 in., almost shining, broadly ovate, pale green, membranous, 3–5-nerved near the usually cordate base. *Clusters* of flowers rather large.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America.

6. **C. mura'le,** *L.*; nearly glabrous, leaves bright green rhombic- or deltoid-ovate acute entire at the cuneate base, upper narrower serrate, spikes short densely panicled, sepals slightly keeled almost covering the utricle, narrowly scarious, seed sharply keeled.

Waste places near houses, rare in England; a doubtful native of Scotland; S. and E. of Ireland, very rare; fl. Aug.–Sept.—Rather fœtid. *Stem* 6–18 in., erect or ascending; branches decumbent. *Leaves* ¾–3 in. broad, rather shining, teeth sharp; petiole shorter than the blade. *Spikes* ½–¾ in. *Seed* rather opaque, punctate.—DISTRIB. Europe, N. Africa, W. Asia to N.W. India; introd. in N. America.

SECTION 2. Annual. *Lateral flowers* of each cluster usually 2–4-merous, seeds vertical; terminal 5-merous, seed horizontal or vertical. *Style* short.

7. **C. ru'brum,** *L.*; glabrous, shining, leaves deltoid or rhombic-ovate, spikes leafy panicled, sepals not keeled covering the utricle narrowly scarious, seeds mostly vertical minute brown shining obscurely keeled.

Waste places, ditches, salt marshes, &c. from the Forth and Clyde southwards; S. and E. of Ireland, very rare; fl. Aug.–Sept.—*Stem* 1–3 ft., erect or ascending. *Leaves* excessively variable, entire irregularly toothed or serrate, obtuse or acute, 3-nerved at the base. *Spikes* very short, in terminal and axillary panicles.—DISTRIB. Europe, Siberia, W. Asia.

Sub-sp. RU'BRUM proper; leaves sinuate-serrate not fleshy, panicle leafy to the top, spikes short compact dense-flowered often almost capitate.—VAR. 1, stem stout, leaves deltoid much serrate, panicles dense-flowered.—VAR. 2, *pseudo-botryo'des*, Wats.; smaller, often reddish, stem slender, leaves rhomboid almost entire, panicles much reduced. *C. botryodes*, Bab. not Sm.

Sub-sp. BOTRYO'DES, *Sm.* (sp.); leaves subentire, fleshy, panicle leafless above.

8. **C. glau'cum,** *L.*; prostrate, leaves mealy beneath oblong or ovate-oblong sinuate-lobed, spikes short dense leafless, sepals keeled nearly covering the utricle narrowly scarious, seeds shining red-brown not keeled.

Waste ground, in the S. of England, not indigenous in the N. or in Scotland; absent from Ireland; native? *Watson;* fl. Aug.–Sept.—*Stem* 6–18 in., usually spreading, widely branched, shining, glabrous. *Leaves* ½–1 in., white

below, tip obtuse or rounded, base cuneate. *Spikes* ¼–1 in., simple or compound, terminal and axillary. *Seeds* variable, very small, the horizontal largest. — DISTRIB. Europe, Canaries, Siberia, W. Asia to the Himalaya, N. America, S. Chili, New Zealand, Australia.

SECTION 3. Perennial, glabrous or nearly so. *Flowers* all 5-merous, or lateral 2–3-androus. *Seeds* nearly all vertical. *Styles* 2–5, very long.

9. **C. Bo'nus-Henri'cus,** *L.*; leaves triangular-hastate subacute, spikes mostly in a compound leafless panicle, sepals not keeled toothed at the tip broadly scarious, seeds large tumid black not keeled. *All-good.*

Waste places, often near houses, from Ross southwards; ascends to 1,200 ft. in the N. of England; common in Ireland; a native? *Watson;* fl. May–Aug.—*Rootstock* stout, fleshy, branched. *Stem* stout, erect or ascending, 1–3 ft., papillose. *Leaves* 2–4 in., succulent, papillose beneath, variable in shape, entire or sparingly sinuate-toothed, petiole of lower long, basal lobes often large acute and spreading. *Spikes* 1–2 in., dense-flowered. *Sepals* shorter than the utricle. *Stamens* 2–5, rarely 0. *Seed* punctulate.—DISTRIB. Europe, Siberia; introd. in N. America. — Cultivated as a pot-herb in Lincolnshire, and called "Mercury."

3. A'TRIPLEX, *Tournef.* ORACHE.

Herbs or shrubs, mealy or scaly. *Leaves* alternate or opposite, petioled, often hastate, entire or sinuate-toothed. *Flowers* small, 1-sexual, ebracteate; clusters usually in branched cymes.—MALE. *Sepals* 3–5. *Stamens* 3–5, hypogynous, filaments filiform. *Ovary* rudimentary.—FEMALE. *Sepals* 2, free or connate. *Stamens* 0. *Styles* 2, filiform, connate at the base. *Utricle* compressed, enclosed in the enlarged calyx. *Seed* compressed, vertical or horizontal, albumen floury; embryo annular.—DISTRIB. Shores and waste places; species 50–60.—ETYM. The old Latin name.

SUB-GEN. 1. **A'triplex** proper. Annuals. *Flowers* monœcious; sepals of female united below. *Pericarp* not adherent to the sepals. *Testa* crustaceous. *Radicle* basal or sublateral.

1. **A. pat'ula,** *L.*; mealy, stem erect or ascending striped, branches spreading, leaves deltoid hastate or rhombic, floral usually broad, sepals rhombic or deltoid usually toothed and tubercled not or rarely hardened.

Waste places, manure-heaps, &c.; fl. June–Oct.—Very variable, 6 in.–3 ft., rarely prostrate, less mealy than *A. laciniata. Female fl.* mostly mixed with the males, but a few axillary ones occur separately. *Fruiting sepals* usually ⅛–½ in. diam. except in sub-sp. *Babingtonii*, excessively variable in form, length of free portion, toothing and sculpture; base hastate truncate or deltoid. *Seeds* usually of two forms, largest ⅛–½ in. diam., dark brown, much compressed; smallest ⅛–⅛, smooth and shining.—DISTRIB. Most cool (Arctic) parts of the globe, native or naturalized.

Sub-sp. PAT'ULA proper; erect or decumbent, deep green, sparingly mealy, lower leaves opposite rhombic or rhombic-hastate with ascending cusps acute entire or serrate, spikes dense simple leafy below, sepals united at the base only deltoid, seeds all vertical.—Common, extending to India; ascends to 1,000 ft. in the N. of England.— VAR. 1, *angustifo'lia*, Sm. (sp.); stem weak procumbent, branches divaricate, leaves subentire, spikes long lax panicled, sepals usually smooth.—VAR. 2, *erec'ta*, Huds. (sp.); stem erect or ascending,

lower leaves deltoid serrate, panicle lax, spikes short dense, sepals denticulate usually muricate on the back.

Sub-sp. HASTA'TA, *L.* (sp.); erect or decumbent, dark green, mealy, lower leaves opposite hastate-deltoid with horizontal cusps subacute entire or toothed, spikes simple or panicled interrupted leafy at the base, sepals deltoid united at the base only, seeds dimorphic, larger brown rough, smaller black smooth.—Common, extending to India; ascends to 1,300 ft. in N. of England.—VAR. 1, *hasta'ta*, Huds. (sp.); upper leaves not hastate, spikes lax, terminal of panicle long, sepals rhombic much longer than the utricle, most of the seeds large. *A. patula*, Sm.; *Smith'ii*, Syme.—VAR. 2, *deltoi'dea*, Bab. (sp.); upper leaves usually hastate, spikes dense, terminal of the panicle short, sepals truncate but little longer than the utricle, seeds mostly small. *A. prostrata*, Bab.

Sub-sp. BABINGTO'NII, *Woods* (sp.); usually pale and very mealy, prostrate, branches spreading ascending, leaves mostly opposite deltoid or rhombic-ovate entire or sinuate-toothed, upper usually similar, clusters of flowers remote, spikes simple lax leafy, sepals connate at the often hardened base or united nearly to the middle, seeds all vertical large pale rather rough.—Sea-shores, abundant.—Very variable; as green as sub-sp. *hastata*, almost as white as *A. laciniata*, from which the striped stems and neither swollen nor much hardened base of the sepals distinguish it.

2. **A. littora'lis,** *L.*; mealy, stem erect striped, branches ascending, leaves linear- or elliptic-oblong usually quite entire upper very narrow, sepals rhombic or deltoid toothed tubercled not hardened.

Salt and brackish marshes, banks, &c. from W. Perth and Fife to Dorset and Kent; rather rare in Ireland; fl. July–Sept.—Best distinguished from *A. patula* by the narrower usually quite entire leaves, which are never hastate and hardly ever rhombic. *Clusters of flowers* in slender terminal spikes. *Seeds* nearly smooth, shining, all vertical.—DISTRIB. Of *A. patula*.

VAR. 1, *littora'lis* proper; leaves quite entire or faintly-toothed, tips of the fruiting sepals often recurved.—VAR. 2, *mari'na*, L. (sp.); leaves serrate or lobed, tips of fruiting sepals appressed. *A. serrata*, Huds.

3. **A. laciniа'ta,** *L.*; clothed with persistent silvery scales, stem not striped reddish, lower leaves opposite rhombic-ovate, upper similar or hastate, floral sessile, sepals cuneate at the swollen hardened base. *A. arenaria*, Woods, not Nuttall; *A. rosea*, L.?

Sandy sea-coasts from the Clyde on the W. and Yorkshire on the E., southwards; fl. July–Oct.—Silvery-white all over. *Stem* angled, branched from the base; branches 4–10 in., diffuse, stout or slender. *Leaves* 1–1½ in., petioles short, acute or obtuse, base cuneate, subentire or irregularly acutely or obtusely lobed toothed or serrate. *Clusters of male flowers* in short dense subpanicled spikes, of female axillary with a few males intermixed. *Fruiting sepals* ⅛–½ in. diam., united to the middle, often broader than long, rhombic, acute or acuminate, entire lobed or toothed; disk often prominently veined or wrinkled, rarely tubercled. *Seed* large, ⅛ in. diam., much compressed, rough, red-brown.—DISTRIB. W. Europe from Norway to France.—This is the plant of *Linn. Herb.*, and is no doubt that intended in the *Sp. Plant.* though described as erect. Linnæus included with it the very similar N. American *A. arenaria*, Nutt. (not Woods), which differs in habit and the seed. As Nuttall's name of *arenaria* must be retained, I adopt the Linnean of *laciniata* for this.

SUB-GEN. 2. **Obi'one,** *Gærtn.* (gen.). Annual or perennial. *Flowers* monœcious or diœcious. *Pericarp* adherent to the cup-shaped perianth. *Testa* coriaceous or crustaceous; radicle superior. *Halimus,* Wallroth.

4. **A. portulacoi'des,** *L.*; shrubby, mealy, leaves obovate- or spathulate-lanceolate quite entire, perianth sessile compressed 2–4-lobed.

Muddy maritime cliffs and marshes, from Wigton and Northumberland southwards; S. and E. of Ireland, very rare; fl. Aug.–Oct.—Covered with minute persistent greyish-white scales. *Rootstock* woody, branched. *Stem* 1–3 ft., woody below, flexuous, decumbent; branches 12–18 in., erect. *Leaves* 1–3 in., mostly opposite, rounded at the tip, narrowed into the petiole, upper linear. *Spikes* in terminal interrupted panicles, leafy below. *Fruiting perianth* ⅛–¼ in., cupular, lobes rounded, unequal. *Seed* chesnut, rough.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia.

5. **A. pedunculata,** *L.*; herbaceous, mealy, leaves narrowly obovate-oblong quite entire, perianth pedicelled, lobes 2 recurved.

Muddy maritime marshes, rare, from Lincoln to Kent; fl. Aug.–Oct.—Annual, mealy like *A. portulacoides.* *Stem* 3–8 in., flexuous, slender, terete, simple or sparingly branched. *Leaves* ½–1½ in., rounded at the tip, shortly petioled. *Spikes* terminal and reduced to axillary fascicles; flowers subsessile, one or few fruiting in each fascicle, when the pedicel elongates to ⅓–½ in., and is very spreading. *Fruiting perianth* ¼ in. diam., campanulate with 2 lateral lobes and 2 intervening small teeth. *Seed* as in *A. portulacoides.*—DISTRIB. Baltic from Gothland southwards, shores of France, Russia, and Siberia.

4. SALICOR'NIA, *Tournef.* MARSH SAMPHIRE.

Annual or perennial leafless herbs. *Stems* cylindric, very succulent, jointed; branches opposite. *Flowers* 2-sexual, minute, 3 together sunk in pits of the axis at the base of the internodes. *Perianth* turbinate, compressed, fleshy, 3–4-lobed or truncate, mouth contracted. *Stamens* 1–2, perigynous. *Styles* 2. *Utricle* compressed, included in the swollen perianth. *Seed* vertical, testa membranous hairy, albumen scanty fleshy or 0; embryo conduplicate green, radicle inferior incumbent, cotyledons ½-terete thick.—DISTRIB. Salt districts, chiefly in temp. regions; species 5–6.—ETYM. *sal* and *cornu,* from the *horn*-like branches.

1. **S. herba'cea,** *L.*; root annual slender, stem ascending, branches more or less fusiform, all flowering.

Salt marshes; fl. Aug.–Sept.—*Stem* 6–18 in., ⅛–⅓ in. diam. at the thickest part, which is above the base; internodes ½ in., usually contracted above and below, 2-lobed at the top when dry, lower woody slender, upper fleshy slightly compressed; branches spreading or ascending; flowering internodes in short spikes. *Flower-bearing* cavities 2 at each node, opposite. *Stamens* inserted at various heights, if 2 successively protruded. *Styles* exserted. *Fruiting* perianth narrowly winged at the top. *Seeds* ovoid or oblong, greenish, covered with curled hairs.—DISTRIB. Europe, N. Africa, N. Asia, W. Asia to India, N. America.—Formerly burnt for Barilla, and sometimes pickled.

VAR. 1, *herba'cea* proper; green, glaucous, ascending, branches suberect, spikes many-flowered.—VAR. 2, *procum'bens,* Sm. (sp.); red, decumbent, branches cruciate, spikes few-flowered.—VAR. 3, *ramosis'sima,* Woods; grass-

green, erect, much-branched, spikes few-flowered. Haling Island.—VAR. 4, *pusil'la*, Woods; very small, spikes about ¼ in. few-flowered.

2. **S. radi'cans,** *Sm.*; rootstock perennial woody creeping sending up herbaceous terete barren and flowering branches.

Salt marshes, from Norfolk southwards to Dorset; fl. Sept.-Oct.—Much more branched and tufted than *S. herbacea*, colour browner, but perhaps only a sub-species. *Stems* ½–2 ft., ⅛–⅛ in. diam.; spikes thicker and more obtuse. —DISTRIB. W. Europe from Denmark southwards.—Erroneously referred to *Arthrocnemum fruticosum* by Moquin Tandon (in DC. *Prodr.*).

Imperfectly known species are *S. lignosa*, Woods (Woods and Kippist, *Linn. Proceedings*, 1851, p. 111), with the growth, &c. of *S. radicans*, but stem shorter thicker more woody below; and *S. megastachya*, Woods, with tubercled hairless seeds, which is possibly an *Arthrocnemum*.

5. SUÆ'DA, *Forsk.* SEABLITE.

Saline herbs or shrubs. *Leaves* fleshy, alternate, terete or ½-terete. *Flowers* 1–2-sexual, small, green, axillary, minutely 3-bracteolate. *Calyx* 5-partite; segments obtuse, not keeled or winged. *Stamens* 5, hypogynous. *Styles* 3–5, compressed. *Utricle* enclosed in the fleshy or dry calyx. *Seed* horizontal or vertical, testa crustaceous, inner coat thin, albumen 0 or fleshy and scanty; embryo in a flat spiral, radicle inferior.—DISTRIB. Salt marshes and shores; species about 33.—ETYM. unknown.

1. **S. marit'ima,** *Dumort.*; stem annual procumbent or ascending branched, leaves subacute tapering at the base, styles 2, seed horizontal. *Schoberia*, C. A. Meyer; *Chenopodina*, Moq. Tand.

Salt marshes; fl. July-Oct.—Glabrous, glaucous, reddish in winter. *Stem* usually branching from the base; branches 3–24 in., straggling, slender. *Leaves* ¼–1 in. or more. *Flowers* 3–5 together, rarely solitary, subsessile. *Seed* shining, striate, brownish-black, beaked.—DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to India, N. America.

2. **S. frutico'sa,** *Forsk.*; stem perennial woody, leaves rounded at the base and tip, styles 3, seed vertical. *Schoberia*, C. A. Meyer.

Sandy and pebbly beaches, rare and local from Norfolk southwards to Dorset; fl. July-Oct.—Glabrous, rather glaucous. *Stem* 1–3 ft., ½ in. diam. at the base; branches erect or ascending. *Leaves* ¼–¾ in., crowded, fleshy, dotted with white. *Flowers* solitary or 2–3 together, subsessile. *Seed* shining, black.—DISTRIB. Europe from Spain eastwards, N. Africa, W. Asia to India. —Formerly burnt for Barilla in S. Europe.

6. SAL'SOLA, *L.* SALTWORT.

Herbs or shrubs. *Leaves* alternate or opposite, sessile, subcylindric or subulate, fleshy rigid or spinescent. *Flowers* small, axillary, sessile, 2-sexual, 2-bracteate. *Sepals* 5, rarely 4, with a broad transverse dorsal wing that forms after flowering. *Stamens* 5, rarely 3, hypogynous; filaments linear free or connate below. *Ovary* subglobose; style elongate, stigmas 2–3 compressed or subulate. *Utricle* depressed, enclosed in the stellately 5-winged much enlarged calyx. *Seed* horizontal, testa membranous, albumen 0; embryo in a conical helix.—DISTRIB. Saline districts in temp. regions; species about 30.—ETYM. *sal*, from yielding alkalies.

1. S. Ka'li, *L.*; herbaceous, rigid, leaves spinous-pointed.

Sandy sea-shores from Argyle and Moray southwards, and in Ireland; fl. July–Aug.—Annual, pubescent or scabrid, glaucous. *Stem* 6–18 in., erect or procumbent, striped; branches many, spreading, flexuous. *Leaves* ½–1½ in., spreading and recurved, fleshy, ovate-subulate, ½-amplexicaul. *Flowers* 1–3; bracts spinescent. *Wings of fruiting perianth* very variable, broad or narrow, scarious, often rose-coloured. *Seed* brown, adherent to the pericarp. —DISTRIB. Europe, N. and S. Africa, Siberia, W. Asia to India, N. and S. America, Australia.—Formerly burnt for Barilla.

ORDER LXIII. THYMELE'Æ.

Shrubs or trees, rarely herbs; juice acrid; inner bark tenacious. *Leaves* alternate or opposite, quite entire, exstipulate. *Flowers* 2-sexual (rarely polygamous), solitary fascicled cymose or capitate. *Calyx* inferior, throat naked or bearing scales glands or staminodes; lobes 4–5, imbricate in bud. *Corolla* 0. *Stamens* 2, 4, 8, or 10, adnate in 1–2 series to and included within the calyx-tube, when equalling its lobes alternate with them; anthers 2-celled. *Disk* 0 or of 4–8 hypogynous scales or glands. *Ovary* free, 1- rarely 2-celled; style terminal or lateral, stigma capitate; ovules 1–3, pendulous, anatropous. *Fruit* a drupe or berry (rarely capsular). *Seed* pendulous, testa thin or crustaceous, albumen scanty or 0; embryo straight, cotyledons plano-convex, radicle short superior.—DISTRIB. Temp. and trop. regions; genera 40; species about 300.—AFFINITIES. With *Elæagneæ*, *Proteaceæ*, and *Santalaceæ*.—PROPERTIES acrid.

1. DAPH'NE, *L.*

Shrubs, rarely tall. *Leaves* usually alternate and persistent. *Flowers* odorous. *Calyx* tubular; lobes 4, spreading; throat naked. *Stamens* 8, subsessile, 2-seriate; anthers fixed by the back. *Style* subterminal, short or 0. *Fruit* coriaceous or fleshy. *Testa* crustaceous.—DISTRIB. Europe, N. Africa, temp. Asia; species about 30.—ETYM. doubtful.

1. D. Laure'ola, *L.*; leaves evergreen, flowers fascicled in the upper leaf-axils green glabrous. *Spurge Laurel.*

Copses and hedgebanks in stiff soils, from York and Durham southwards; not native in Scotland or Ireland; fl. Jan.–April.—Shrub 1–3 ft., leafless below, branches few. *Leaves* 2–5 in., very coriaceous, obovate-lanceolate, acute, subsessile. *Cymes* few-flowered; bracts oblong, deciduous; flowers ½ in., inclined, males and 2-sexual intermixed. *Calyx-lobes* ½ the length of the tube. *Drupe* ½ in., ovoid, black.—DISTRIB. Europe from Belgium southwards, excl. Russia, N. Africa, W. Asia.—Berry very poisonous.

2. D. Meze'reum, *L.*; leaves deciduous, flowers appearing before the leaves clustered on the branches pink silky. *Mezereon.*

Copses and woods, perhaps native in the S.; an alien or denizen, *Watson*; fl. Feb.–April.—Shrub 2–4 ft.; branches few, erect. *Leaves* 2–3 in., obovate- or spathulate-lanceolate, acute, membranous, petioled. *Flowers* usually in threes, subsessile in the axils of the last year's leaves, very fragrant, rarely white; bracts small. *Calyx* ½ in. diam., tube as long as the lobes. *Berry*

½ in., bright red, ovoid.—DISTRIB. Europe (Arctic), Siberia.—Acrid and poisonous; leaves used as a vesicant; berries cathartic.

ORDER LXIV. ELÆAG'NEÆ.

Shrubs or trees, with copious silvery or brown scales; buds naked. *Leaves* alternate or opposite, quite entire, exstipulate. *Flowers* small, regular, 1–2-sexual, axillary, fascicled or cymose, white or yellow. *Calyx* in the 2-sexual and female fl. tubular, 2–6 cleft, lobes imbricate or valvate in bud; in male fl. of 2 or 4 sepals free or connate below. *Corolla* 0. *Disk* 0, or lining the calyx-tube, often thickened round the style. *Stamens* adnate to the calyx-tube, in the male fl. twice as many as the lobes, in the 2-sexual as many as and opposite the lobes; anthers fixed by the back or base. *Ovary* free, sessile, enclosed in the thickened calyx-base, 1-celled; style filiform, stigma lateral; ovule 1, basal, erect, anatropous. *Fruit* indehiscent, enclosed in the calyx-tube. *Seed* ascending, testa thick or thin, albumen 0 or scanty; embryo straight axile, cotyledons thick, radicle inferior.—DISTRIB. N. temp. and trop. zones; genera 4; species 20.—AFFINITIES. With *Thymeleæ*.—PROPERTIES unimportant.

1. HIPPOPH'AE, *L.* SEA BUCKTHORN.

A shining silvery willow-like diœcious shrub. *Leaves* alternate. MALE fl. in axillary clusters. *Sepals* 2. *Stamens* 4. FEM. fl. solitary. *Calyx* tubular, minutely 2-lobed. *Fruit* a membranous utricle enclosed in the succulent calyx-tube. *Seed* oblong, grooved on one side, testa crustaceous shining, albumen a thin fleshy layer; embryo amygdaloid.—DISTRIB. Europe, N. and Central Asia to the Himalaya.—ETYM. doubtful.

1. **H. rhamnoi'des,** *L.*; leaves obovate or linear-oblong, petiole short.

Sandy sea-shores, not common; indigenous in the S., naturalized as far N. as Isla and Fife; absent from Ireland.—Shrub 1–8 ft.; branches slender and subpendulous, or short and spinescent. *Leaves* ¼–2 in., dull green above, silvery beneath. *Flowers* on the old wood; male minute; sepals broadly oblong; filaments short; anthers yellow. *Fruit* ⅛ in. diam., globose or oblong, orange-yellow.—The description of the fruit I owe to Dr. Dickson.

ORDER LXV. LORANTHA'CEÆ.

Evergreen parasitic shrubs. *Stem* often jointed. *Leaves* usually opposite, coriaceous, exstipulate. *Flowers* 1–2-sexual; inflorescence various. *Sepals* thick, 4, 6, or 8, superior, free or united into a tubular calyx, lobes valvate in bud. *Corolla* 0. *Stamens*, one adnate to each calyx-lobe, filaments various or 0; anther 2-celled, opening by slits, or many-celled and opening by as many pores. *Disk* annular, epigynous or 0. *Ovary* inferior, 1-celled; style simple or 0, stigma simple; ovule 1, reduced to a nucleus or to an embryo sac, basal, erect, orthotropous, adnate to the walls of the ovary. *Berry* 1-seeded. *Seed* erect, testa thin, albumen copious fleshy; embryos 1 or more, cotyledons thin or plano-convex, radicle

superior.—DISTRIB. Chiefly trop. but many temp.; genera 13; species about 450.—AFFINITIES. Very near *Santalaceæ*.—PROPERTIES unimportant.

1. VIS'CUM, *L.* MISTLETOE.

Leaves opposite whorled or 0. *Flowers* 1-sexual, small, green, spiked or clustered in the forks or internodes of the branches. *Sepals* 4, triangular. *Anthers* sessile, cells many, opening by pores. *Stigma* sessile.—DISTRIB. of the Order; species about 100 ?—ETYM. *ἰξός*, or *βισκός* of the Greeks.

1. **V. al'bum,** *L.*; leaves obovate-lanceolate obtuse 5–7-nerved.

On various trees, most rare on the oak, from York and Denbigh southwards; not native in Scotland or Ireland; fl. March–May.—Shrub 1–4 ft., yellow-green, glabrous; branches terete, dichotomous, knotted. *Leaves* 1–3 in., opposite or in whorls of 3. *Flowers* in threes, inconspicuous, green, 2-bracteate. *Berry* white, nearly ½ in. diam., ovoid or globose, viscid. *Embryos* 1–3, green; when 2, often united by the cotyledons.—DISTRIB. Europe, N. Asia.

ORDER LXVI. **SANTALA'CEÆ.**

Herbs, shrubs, or trees, usually parasitic on roots. *Leaves* mostly alternate, quite entire, exstipulate. *Flowers* 1-2-sexual, small or minute, solitary or cymose, 2-bracteolate. *Calyx* inferior or becoming adherent to the ovary; lobes 3–5, valvate in bud, often with a tuft of hairs on their face. *Stamens* opposite and adnate to the calyx-lobes, filaments short; anthers fixed by the base or back. *Disk* epigynous, often dilated and lobed. *Ovary* 1-celled; style short, stigmas 1–5; ovules 2–5, reduced to a naked pendulous nucleus, placenta basal erect. *Fruit* indehiscent, 1-celled, 1-seeded. *Seed* adhering to the placenta, and often to the pericarp, albumen fleshy; embryo straight axile, cotyledons plano-convex, radicle superior.—DISTRIB. All regions; genera 20; species 200.—AFFINITIES. With *Loranthaceæ*, *Olacineæ*, and *Corneæ*.—PROPERTIES. Unimportant, except the fragrant wood of *Santalum*.

1. THE'SIUM, *L.* BASTARD TOAD-FLAX.

Slender, herbaceous, perennial root-parasites. *Leaves* alternate, narrow, decurrent 1–3-nerved. *Flowers* minute, green, solitary and axillary or in 2-chotomous cymes, 2-sexual. *Calyx-tube* short or long, limb 5- rarely 4-lobed, persistent; lobes with a tuft of hairs on the face. *Ovary* inferior; style short, stigma capitate; ovules 3. *Fruit* ribbed.—DISTRIB. Temp. Europe, Asia, N. and S. Africa, S. America; species about 60.—ETYM. Obscure.

1. **T. linophyl'lum,** *L.*; stems diffuse, leaves 1-nerved, pedicels scabrid. *T. humifusum*, DC.; *T. divaricatum*, var. *anglicum*, A. DC.

Dry chalky pastures, from Norfolk and Gloucestershire southwards; fl. May–July.—*Rootstock* woody, yellow; roots fibrous, attached to those of various plants. *Stems* many, 6–18 in., leafy, prostrate. *Leaves* ½–1½ in., linear-lanceolate, acute or obtuse. *Flowers* ⅛ in. diam., racemed or fascicled, pedicelled, white inside. *Calyx* funnel-shaped, lobes incurved in fruit, toothed. *Fruit* ⅛ in., green, ovoid, contracted into the short stout pedicel.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia.

ORDER LXVII. ARISTOLO'CHIEÆ.

Herbs or shrubs, often climbing. *Leaves* alternate, entire or lobed, exstipulate. *Flowers* 2-sexual, solitary spiked or racemed, regular or irregular. *Calyx* superior, tubular, campanulate or trumpet-shaped; limb 3-lobed or lipped, valvate in bud. *Stamens* 6 or 12, rarely 5, epigynous, filaments short or 0; anthers free or adnate to the style, cells 2 bursting outwards or inwards. *Ovary* 4–6-celled; styles 6, inner surface stigmatic; ovules very many, anatropous, 2-seriate in the inner angles of the cells. *Fruit* a 4–6-valved septicidal capsule, or a berry. *Seeds* horizontal flattened or boat-shaped, raphe thickened, albumen copious fleshy or horny; embryo minute basilar, cotyledons short, radicle usually next the hilum.—DISTRIB. Chiefly trop.; genera 5; species 180.—AFFINITIES. With *Nepenthaceæ* and *Rafflesiaceæ*.—PROPERTIES. Bitter, acrid, sometimes aromatic.

Calyx campanulate, regularly 3-cleft. Stamens 12.....1. Asarum.
Calyx tubular, mouth oblique. Stamens 6.....1*. *Aristolochia.*

1. AS'ARUM, *Tournef.* ASARABACCA.

Perennial herbs. *Rootstock* stout, branched, woody. *Leaves* radical. *Flower* solitary, peduncled, terminal, lurid purple. *Calyx* campanulate, regular, persistent, 3-lobed. *Stamens* 12, epigynous; anthers 2-celled, bursting outwards; connective produced. *Ovary* inferior or ½-inferior, 6-celled; styles 6, tubular, grooved or 2-fid. *Capsule* coriaceous, bursting irregularly. *Seeds* boat-shaped, wrinkled on the convex face, with a median winged or fleshy raphe on the other.—DISTRIB. Europe, N. Asia, Himalaya, N. America; species 10.—ETYM. doubtful.

1. **A. europæ'um,** *L.*; pubescent, leaves evergreen reniform.

Copses in Wilts, Yorkshire, Westmoreland, &c.; a denizen, *Watson;* fl. May.—*Rootstock* creeping, fleshy; branches and stems short, sending up annually a pair of leaves and 2 large scales. *Leaves* 2–3 in. diam., dark green, petiole 3–5 in. *Scapes* from between the leaves, very short, woolly. *Calyx* ½ in., greenish-purple outside. *Filaments* subulate, alternate longer; connective with a long subulate tip. *Styles* recurved, their stigmatic tips projecting between the anthers. *Fruit* globose.—DISTRIB. Europe from Belgium southwards, W. Siberia.—Root cathartic, emetic, and sternutatory.

1*. *ARISTOLO'CHIA, Tournef.* BIRTHWORT.

Shrubs or perennial herbs, often twining. *Leaves* cauline; petioles with dilated bases, having in their axils solitary or racemose flowers and often the stipule-like leaf of an undeveloped bud. *Calyx* coloured, tube inflated at the base, then contracted, hairy inside; limb dilated, obliquely 1–2-lipped. *Anthers* 6, rarely 5 or more, adnate in a whorl to the very stout short 6-lobed style. *Capsule* septicidally 6-valved.—DISTRIB. Chiefly trop.; species 160.—ETYM. The old Greek name.

A. CLEMATI'TIS, *L.*; glabrous, flowers clustered, lip narrow acute.

Ruins, &c., from York southwards, rare and not indigenous; fl. June–Sept.—*Rootstock* creeping, woody. *Stems* many, erect, simple, angled. *Leaves* 3–6 in. diam., broadly cordate, obtuse, apiculate, reticulate, glaucous beneath; auricles rounded, incurved, almost enclosing the deep sinus. *Flowers* 4–8 in a cluster; pedicels very short. *Ovary* fusiform. *Calyx* 1 in.,

yellow; tube slender, globose at the base, curved; lip ½ in., oblong or ovate; throat dilated. *Capsule* ¾-1 in., pyriform, obtuse; peduncle decurved. *Seeds* suborbicular, much compressed, granulate, deeply excavated on the ventral face.—DISTRIB. Europe from Denmark southwards, W. Asia.

ORDER LXVIII. EUPHORBIA'CEÆ.

Herbs, shrubs, or trees, juice often milky. *Leaves* usually alternate, simple, often stipulate. *Flowers* small or minute, usually 1-sexual, bracteate or involucrate. *Calyx* 0, or sepals 2 or more. *Petals* 0 (in British genera).—MALE. *Stamens* 1 or more; anthers didymous. *Ovary* rudimentary or 0.—FEMALE. *Ovary* 2-3-lobed, 2-3-celled; styles 2-3, stigmas entire or lobed. *Ovules* 1-2, collateral, pendulous from the top of each cell, funicle dilated over the micropyle. *Capsule* 2-3-lobed and -celled, cells 1-2 seeded. *Seeds* pendulous, testa usually crustaceous, funicle often swollen at the top (seeds carunculate), albumen copious fleshy; embryo axile, radicle superior.—DISTRIB. All climates except Arctic; genera 180; species about 3,000.—AFFINITIES. Close with *Malvaceæ* and *Urticeæ*.—PROPERTIES. Usually acrid, but too numerous to specify.—The above diagnosis includes the British genera of this vast Order, to enumerate all the characters of which would exceed the limits of this Flora.

SUB-ORDER I. **Euphor'bieæ.** *Ovules* 1-2 in each cell; raphe ventral. *Capsule* septicidal; valves elastically breaking away from the seed-bearing axis.

TRIBE I. **EUPHOR'BIÆ.** Herbs or shrubs; juice milky. *Stamens* many, collected into a calyx-like involucre (perianth of some).. *Pistil* solitary, pedicelled, 3-lobed, 3-celled.....1. Euphorbia.

TRIBE II. **ACAL'YPHEÆ.** Herbs or shrubs, juice not milky. *Flowers* not in calyx-like involucres; male with 3 valvate sepals; female a 2-3-celled ovary.....2. Mercurialis.

SUB-ORDER II. **Buxe'æ.** *Ovules* 2 in each cell; raphe dorsal. *Capsule* loculicidal.....3. Buxus.

1. EUPHOR'BIA, *L.* SPURGE.

Herbs (the British species). *Inflorescence* of many male and one female flower in a 4-5-lobed involucre (perianth of some); lobes with thick glands at the sinuses.—MALE fl. a pedicelled stamen; anther didymous.—FEMALE fl. *Ovary* on a lengthening pedicel, inclined or pendulous; stigmas 2-fid. *Capsule* 3-lobed, 3-valved, valves with a coriaceous exocarp separable from a hard 2-valved endocarp.—DISTRIB. Of the Order; species 700.—ETYM. The old Greek name.

SECTION 1. *Leaves* exstipulate. *Branches* (or stem, if simple) terminated by umbels of forked branchlets (rays) subtended by a whorl of leaves; rays 2-bracteate at the forks.

* *Leaves* alternate. *Umbels* 5- rarely 3-4- rayed. *Glands of involucre* transversely oblong reniform or orbicular, not cuspidate.

1. **E. Heliosco'pia,** *L.*; annual, glabrous, rarely pilose, leaves obovate serrate above the middle, upper bracts broadly ovate-cordate, capsule smooth, seeds deeply pitted. *Sun Spurge.*

Fields and waste places, ascending to 1,000 ft. in the Highlands; fl. June–Oct. —Subglaucous. *Stem* 6–18 in., simple or 3-fid below. *Leaves* 1–2 in., narrowly obovate, sometimes cuneate, subpetioled, rounded at the top, membranous; lower smaller. *Involucral glands* orbicular, yellow. *Capsule* ⅛ in., *Seeds* brown.—DISTRIB. Europe, N. Africa, N. Asia, W. Asia to India, introd. in N. America.

2. **E. platyphyl'los,** *L.*; annual, glabrous or pilose, leaves linear-oblong or obovate-lanceolate acute serrulate above the middle, bracts cordate, capsule warted, seeds smooth.

Fields and waste places, rare, from Yorkshire southwards; fl. July–Oct.—*Stem* ½–3 ft., usually simple, stout, erect; branches numerous, alternate, slender, ascending. *Leaves* ½–1½ in., sessile, spreading or reflexed. *Bracts* short, broad, apiculate. *Involucral glands* suborbicular.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia; introd. in N. America.

Sub-sp. PLATYPHYL'LOS proper; bracts ½–¾ in., capsule ⅛ in. long, warts hemispherical, seeds olive-brown.

Sub-sp. STRIC'TA, *L.* (sp.); bracts ¼–½ in., capsule ⅛ in., warts conical, seeds oblong smaller red-brown.—Woods on limestone in Gloster and Monmouth.

3. **E. hiber'na,** *L.*; perennial, pubescent, leaves elliptic- or lanceolate-oblong quite entire, upper cordate, bracts ovate-cordate, capsule furrowed and warted, seeds smooth.

Copses and hedges, Linton in N. Devon; S.W. of Ireland, rare; fl. May–June.—*Rootstock* stout. *Stems* 1–2 ft., several, subsimple, leafy. *Leaves* 2–4 in., 1–1½ in. broad, sessile, obtuse or notched at the tip, thin. *Bracts* broad, upper rounded at the base. *Involucral glands* reniform. *Capsule* ¼ in., subglobose, valves not keeled, warts cylindric. *Seeds* broad, pale brown.—DISTRIB. France, Switzerland, Italy.—Used in Ireland to poison fish.

4. **E. pilo'sa,** *L.*; perennial, pubescent or pilose, leaves linear-oblong obtuse serrulate, upper not cordate, bracts broadly ovate glabrous, capsule glandular, seeds smooth. *E. palustris*, Forst. not L.

Copses and hedges; Prior's Bank, Bath; Westmeston, Sussex; fl. May–June. —*Rootstock* stout. *Stems* 1–3 ft., stout, leafy, much branched above. *Leaves* 2–5 in., obtuse, narrowed at the base, lower obscurely petioled, upper sessile. *Bracts* short, often orbicular. *Involucre* large; glands large, oblong, purple. *Capsule* ⅛ in., glands prominent, with pencils of hairs. *Seeds* broad, brown.—DISTRIB. Europe from S. France and Germany southwards, W. Siberia.—Boissier refers this, the "English Botany" plant (t. 2787), to *E. palustris*, L., which he places amongst "species annuæ," yet describes the rootstock as thick; he further describes the warts of the capsule as oblong-cylindric, which is not the case in the figure, nor in British specimens which best agree with Linnæus' description of *pilosa*.

E. CORALLOI'DES, *L.*; perennial, villous, leaves linear-oblong obtuse serrulate, upper not cordate, bracts ovate or ovate-lanceolate pubescent, capsule quite smooth villous eglandular, seeds smooth.

Hedges, Slinfold Parsonage, Sussex; naturalized; fl. May–June.—According to Syme, best distinguished from *E. pilosa*, to which it is extremely near, by the smaller rootstock; reddish less branched stem; more regular and open umbel; softer pubescence; pubescent upper bracts, and quite smooth capsule. —DISTRIB. N. Sicily and Naples.

** *Leaves* alternate. *Umbels* 3- or many-rayed. *Glands of involucre* reniform or lunate with cuspidate tips.

† *Bracts connate at the base.*

5. **E. amygdaloi'des,** *L.*; perennial, hairy, leaves obovate-lanceolate quite entire, capsules glabrous minutely dotted, seeds smooth grey.

Woods, copses, &c. from Northumberland and Yorkshire southwards, local; Bandon in Ireland; fl. March–May.—*Rootstock* woody. *Stems* 6–12 in., erect, very stout, leafy, barren the first year, elongating the following to 2 ft., then throwing out slender branches. *Leaves* 2–3 in., obtuse or acute, lower petioled, upper sessile often oblong. *Rays* 5–10; bracts connate into an orbicular limb ¾–1 in. diam., yellow. *Involucres* broad, pedicels slender, cusps of glands converging. *Capsule* with rounded valves. *Seed* subglobose, acute.—DISTRIB. Europe from Holland southwards, W. Siberia, W. Asia.

†† *Bracts free at the base. All glabrous.*

6. **E. Pep'lus,** *L.*; annual, leaves orbicular-obovate quite entire, bracts ovate, capsules small, valves keeled, seeds pitted whitish.

Gardens, fields, and waste places, ascending to 1,000 ft. in the Highlands; a native or colonist, *Watson;* fl. July–Nov.—*Stems* 6–10 in., simple or 3-chotomous at the base. *Leaves* ½–¾ in., sessile or with short slender petioles, thin. *Rays* 3, repeatedly forked. *Involucres* small; cusps of glands slender, curved. *Capsule-valves* with 2 keels on the back. *Seeds* 3-gonous, deeply pitted and keeled on the back, with 2 facial furrows.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India; introd. in N. America.

7. **E. exig'ua,** *L.*; annual, leaves linear-lanceolate quite entire obtuse or acute, bracts cordate at the base, capsules rough on the back of the valves, seeds pale deeply pitted.

Fields, &c. from Banff and Forfar southwards, local in Ireland; a colonist, *Watson;* fl. July–Oct.—Very variable. *Stems* usually excessively branched from the base; branches 6–15 in., erect and strict, or prostrate curved and ascending. *Leaves* ½–1 in., very variable, broadest above or below the middle, sometimes truncate and apiculate. *Rays* 3–5, often forked; bracts often toothed at the base. *Involucres* small, subsessile; tips of glands obtuse. *Capsules* small. *Seeds* obtusely 3-gonous, keeled, grey.—DISTRIB. Europe, N. Africa, W. Siberia, W. Asia to N.W. India.

8. **E. portland'ica,** *L.*; perennial, leaves coriaceous obovate or oblong-obovate quite entire, bracts deltoid- or reniform-cordate, capsules slightly rough on the back of the valves, seeds opaque brown pitted.

Sea-shores, from Wigton to the I. of Wight, rare; N. S. and E. of Ireland; fl. May–Aug.—*Rootstock* cylindric, woody, tortuous. *Stems* 6–18 in., very many, tufted, erect or ascending, naked and scarred below, branched, leafy above. *Leaves* ½–¾ in., spreading, acute or apiculate. *Rays* 3–5; bracts ½–½ in. diam., broader than long, often keeled and cuspidate. *Capsule-valves* faintly keeled, granulate. *Seed* with shallow pits, cuticle brown, caruncle large.—DISTRIB. Coasts of France and Spain.

9. **E. Para'lias,** *L.*; perennial, leaves imbricate coriaceous quite entire, lower linear-obovate or -oblong, upper ovate, bracts broadly cordate, capsules leathery wrinkled, seeds minutely dotted whitish.

Sandy shores, from Cumberland and Suffolk southwards; rare and local in

Ireland; fl. July–Oct.—Bushy, glaucous, often reddish. *Rootstock* woody. *Stems* 6–18 in., many, stout, erect or ascending, naked and tubercled below. *Leaves* ½–1 in., very thick, sessile, obtuse, concave above, nerveless, margins incurved when dry. *Rays* 5–8, short and stout, forked once or twice; bracts variable, ¼–¾ in. diam., sometimes broader than long. *Involucres* sessile or pedicelled, cusps of glands short. *Capsules* deeply lobed, valves very rugose, with a dorsal furrow. *Seed* ovoid, caruncle minute.—DISTRIB. Europe from Belgium southwards, excl. Greece and Turkey.

E. E'SULA, *L.*; perennial, leaves linear or oblong-lanceolate, bracts broadly cordate mucronate, capsule granulate, seeds smooth ovoid brown.

Woods and fields, introduced near Forfar, Edinburgh, and Alnwick; fl. July.—*Rootstock* creeping. *Stem* 1–2 ft., erect, slender, naked below, simple or with leafy floweriess lateral branches. *Leaves* 1–1½ in., sessile, spreading, acute or obtuse, sometimes denticulate, thin, 1-nerved. *Rays* 10–20, long, slender, forked only at the tips; bracts ½–¾ in. diam., reniform-cordate, acute or obtuse. *Involucres* small, long-pedicelled; glands with short straight cusps. *Capsule* small, valves rugose and with a dorsal furrow. *Seeds* quite smooth, caruncle small.—DISTRIB. Europe, Persia, Mid. and N. Asia; introd. in N. America.

E. CYPARIS'SIAS, *L.*; perennial, leaves narrow-linear quite entire, bracts cordate obtuse, capsule granulate, seeds smooth globose pale.

Woods and plantations, introduced from Cumberland southwards; fl. June–July.—Habit of *E. Esula*, but rather glaucous; rootstock creeping and stoloniferous; more leafy; leaves narrower; bracts smaller, and seeds almost white.—DISTRIB. Europe, excl. Turkey; introd. in N. America.

*** *Leaves* opposite. *Umbels* 3–4-rayed. *Glands of involucre* lunate, cuspidate.

E. LATH'YRIS, *L.*; biennial, leaves decussate linear-oblong broader at the base obtuse, bracts cordate at the base, capsule smooth, seeds ridged and wrinkled dusky brown.

Corses and woods, naturalized in England and Scotland; an alien, *Watson*; fl. June–July.—Glabrous, glaucous. *Stem* stout, erect, short, leafy the first year, during the next elongating to 3–4 ft., and flowering. *Leaves* 2–8 in., sessile, spreading, 1-nerved, tips rounded, apiculate. *Rays* stout, unequal, irregularly forked; bracts 1–3 in., ovate-lanceolate, acute. *Involucres* large, sessile, cusps of glands subereot. *Capsule* ⅓ in. diam. *Seed* ⅛ in., broadly oblong, obliquely truncate, caruncle large.—DISTRIB. Europe S. of the Alps; introd. in N. America.

SECTION 2. *Stems* prostrate, dichotomously branched. *Leaves* opposite, stipulate. *Involucres* axillary or in the forks, solitary.

10. **E. Pep'lis,** *L.*; annual, glabrous, leaves dimidiate-cordate subentire.

Sandy shores, I. of Wight west to Cardigan, very rare and uncertain in appearance; Waterford in Ireland; Channel Is.; fl. July–Sept.—Procumbent, glaucous, purplish. *Stems* many, 6–12 in., spreading from the root. *Leaves* ½ in., coriaceous, shortly petioled, obtuse or retuso, base on one side produced outwards and downwards into a rounded auricle, on the other obliquely cut off; stipules ovate, 2-fid. *Involucres* shortly pedicelled, glands oblong. *Capsule* ⅛ in., valves smooth, keeled, glabrous. *Seeds* white, not caruncled.—DISTRIB. Shores of Atlantic and Mediterranean from France southwards; salt tracts of W. Siberia, W. Asia.

2. MERCURIA'LIS, *Tournef.* DOG'S MERCURY.

Erect herbs. *Leaves* opposite, petioled, serrate, stipulate. *Flowers* mon- di-œcious, minute; males in interrupted axillary spikes; females clustered, spiked or racemose. *Sepals* 3, valvate. *Disk* in the female of 2 elongate glands, alternating with the carpels. *Stamens* 8–20, on a central disk, filaments slender erect; anther-cells pendulous from a subglobose connective, bursting outwards. *Ovary* 2-celled, styles long, simple, subulate; ovule solitary, pendulous. *Capsule* didymous, outer coat separating from the cartilaginous 2-valved inner. *Seeds* pitted or wrinkled, funicle thickened; cotyledons broad.—DISTRIB. Europe, N. Africa, temp. Asia to Japan; species 6.—ETYM. unknown.

1. **M. peren'nis,** *L.*; perennial, pilose, dicœcious, stem simple.

Woods and shady places, ascending to 1,700 ft. in the Highlands; fl. March–April.—*Rootstock* slender, creeping. *Stem* 6–18 in., solitary, erect, terminal. *Leaves* larger upwards, upper 2–3 in., shortly petioled, ovate or elliptic-lanceolate, crenate-serrate, green, often blue when dry; stipules minute. *Male spikes* very slender, long-peduncled, flowers pedicelled. *Sepals* acute. *Female spikes* or racemes shorter, 1–3-floworod; styles long, recurved, stigmatic all over the front. *Capsule* ¼ in. diam., hispid. *Seeds* grey, cuticle white.—DISTRIB. Europe, N. Africa.—*M. ovata,* Sternb. and Hoppe, with broader subsessile leaves, is hardly a variety.

2. **M. an'nua,** *L.*; annual, nearly glabrous, stem branched.

Fields, gardens, &c. from Fife and Perth southwards; rare in Ireland; a colonist? *Watson;* fl. July–Oct.—Dicœcious or monœcious (*M. ambigua,* L. fil.). *Stem* 6–18 in. *Leaves* membranous, shortly petioled, ovate or lanceolate, narrowest in the female, acute, rounded or cordate at the base, shining, crenate-serrate, ciliate. *Male flower* clustered in peduncled axillary spikes; female in axillary clusters with sometimes males intermixed; styles diverging, stigmatic on the sides in front. *Capsule* small, tubercled, hispid. *Seeds* brown, reticulate.—DISTRIB. Europe, N. Africa, W. Asia.—Leaves boiled and eaten as a pot-herb.

3. BUX'US, *Tournef.* BOX.

Evergreen shrubs. *Leaves* alternate, exstipulate. *Flowers* monœcious, in axillary fascicles or spikes, green, 4-bracteolate, uppermost female. —MALE. *Sepals* 4, 2 outer imbricate in bud. *Stamens* 4, hypogynous, opposite the sepals, filaments stout fleshy; anthers 2-celled, bursting inwards. *Ovary* rudimentary. — FEMALE. *Sepals* 4–12, often imbricate in threes. *Ovary* free, 3-celled, top 3-lobed between the styles; styles 3, excentric, spreading, persistent, grooved and stigmatic on the inner face; ovules suspended in pairs in each cell, anatropous, raphe dorsal. *Capsule* coriaceous, 3-celled, loculicidally 3-valved; cells 1–2-seeded. *Seeds* pendulous, testa crustaceous shining thickened at the base, albumen fleshy; embryo axile, curved, radicle superior.—DISTRIB. Europe, Africa, Madagascar, Asia, W. Indies; species 17.—ETYM. πύξος of the Greeks.

1. **B. sempervi'rens,** *L.*; leaves oblong, flowers sessile.

Chalk hills of Kent, Surrey, Bucks, and Gloucester; indigenous in Surrey; a denizen, *Watson;* fl. April–May.—A shrub or small tree, 8–12 ft.; branches erect or drooping, young pubescent, wood close-grained. *Leaves* ½–1 in.,

obtuse or retuse. *Spikes* small; bracts and sepals obtuse; flowers whitish, very crowded. *Stamens* much exserted; anthers didymous. *Ovary* globose. *Capsule* ½ in., ovoid, 3-horned, wrinkled. *Seeds* black.—DISTRIB. Europe from Belgium southwards, N. Africa, N. Asia to Japan, W. Asia to W. Himalaya. —Bitter and poisonous; wood used for engraving upon.

ORDER LXIX. CERATOPHYLLEÆ.

A submerged, branched, slender, fragile herb; stems cylindric. *Leaves* whorled, sessile, exstipulate, 2-chotomously cut into linear-toothed lobes. *Flowers* solitary, axillary, minute, monœcious, enclosed in a 8–12-partite persistent involucre with subulate lobes. *Perianth* 0.—MALE. *Anthers* many, crowded, sessile, oblong, cells linear, sunk in a fleshy 2-cuspidate connective, bursting irregularly. — FEMALE. *Ovary* oblong, 1-celled; style terminal, subulate, persistent, stigma unilateral papillose; ovule 1, pendulous from the top of the cell, orthotropous. *Fruit* coriaceous, indehiscent, tubercled winged or spurred at the base. *Seed* pendulous, testa membranous, hilum thickened, albumen 0; cotyledons 2-fid ovoid thick, plumule large many-leaved, radicle very short.—DISTRIB. Europe, Asia, Africa, N. America (Arctic).—AFFINITIES altogether doubtful.—PROPERTIES unknown.—ETYM. κέρας and φύλλον, from the *horn*-like *leaf*-lobes.

1. CERATOPHYLLUM, *L.* HORNWORT.

1. **C. demer'sum,** *L.*; leaves remotely serrate.

Ponds and ditches, from Forfarshire southwards, and in Ireland; fl. July–Sept.—*Stems* 8 in.–3 ft., densely leafy. *Leaves* 1 in., segments spreading, subulate, dark green. *Flowers* found in shallow water only, very inconspicuous. *Fruit* ¼ in., tipped with the slender curved style, very variable.

Sub-sp. DEMER'SUM proper; fruit smooth, spurs 2 subulate. *C. apiculatum,* Cham.

Sub-sp. SUBMER'SUM, *L.* (sp.); fruit not spurred, covered when mature with cylindric projections.—S.E. of England, rare.

ORDER LXX. URTI'CEÆ.

Herbs, shrubs, or trees; juice watery. *Leaves* opposite or alternate, stipulate or not. *Flowers* 1-sexual, small, green.—MALE. *Calyx* 4–5-partite, concave. *Stamens* 4–5, opposite the sepals, filaments transversely furrowed, inflexed in bud, springing up elastically; anthers fixed at the back, bursting inwards. *Ovary* rudimentary.—FEMALE. *Calyx* tubular or 3–5-cleft. *Staminodes* 3–5 or 0. *Ovary* sessile, ovoid, 1-celled; style simple or 0, terminal or lateral, stigma lateral or terminal glandular or penicillate; ovule basal, erect, orthotropous. *Fruit* minute, dry or fleshy, indehiscent, free or adhering to the calyx. *Seed* erect, testa thin, albumen fleshy usually scanty; embryo axile, straight, cotyledons plano-convex, radicle superior.—DISTRIB. All climates; genera 43; species 500.—AFFINITIES. With *Ulmaceæ, Cannabineæ, Malvaceæ,* and *Euphorbiaceæ.*—PROPERTIES. The inner bark affords valuable fibre.

Leaves opposite, with stinging hairs.....1. Urtica.
Leaves alternate, with simple hairs.....2. Parietaria.

1. URTI'CA, *Tournef.* NETTLE.

Herbs, rarely shrubby, with stinging hairs and tenacious inner bark. *Leaves* opposite; stipules lateral. *Flowers* mon- di-œcious in bracteate clusters, ebracteolate. — MALE. *Pedicel* jointed. *Calyx* 4-partite, persistent; lobes concave, imbricate in bud. *Stamens* 4; anthers reniform. —FEMALE. *Calyx* 4-partite, segments unequal, flat. *Stigma* subsessile, penicillate. *Fruit* compressed.—DISTRIB. Temp. and trop. regions; species 37.—ETYM. *uro*, from the *burning* pain of its stings.

1. **U. u'rens,** *L.*; annual, glabrous except for the stinging hairs, leaves ovate-oblong coarsely serrate, panicles 2-sexual.

Fields and waste places; ascending to 1,600 ft. in Northumberland; fl. June–Sept.—*Stem* 1–2 ft., erect, branched. *Leaves* 1–2 in., petioled; teeth few, terminal oblong; stipules 2 on each side. *Spikes* ¼–1 in., in pairs. *Flowers* few in a cluster; pedicels long or short. — DISTRIB. Europe (Arctic), N. Africa, Siberia, W. Asia to the Himalaya; introd. in N. America.

2. **U. dioi'ca,** *L.*; perennial, pubescent, leaves ovate-cordate or lanceolate deeply serrate, panicles usually 1-sexual.

Hedgebanks, &c., ascending to 2,500 ft. in the Highlands; fl. June–Sept. —*Rootstock* creeping, stoloniferous. *Stem* 2–4 ft., simple or branched. *Leaves* 2–4 in., petioles long or short, nerves impressed; stipules 2 on each side, linear-oblong. *Panicles* 1–3 in., in pairs; males lax- females dense-flowered, recurved.—DISTRIB. N. temp. regions (Arctic), S. Africa, Andes, Australia.—The young leaves are a good pot-herb, and yield a green dye.

3. **U. pilulif'era,** *L.*; annual, glabrous except for the stinging hairs, leaves ovate or cordate entire or toothed, female flowers capitate.

Waste places in England, chiefly near the sea, but rarely established; an alien, *Watson;* fl. June–Aug.—*Stem* 1–2 ft., simple or branched. *Leaves* 1–3 in., long-petioled; stipules two on each side, ovate. *Male spikes,* panicled, peduncles very slender elongate. *Female heads* ⅛ in. diam.; peduncles ½ in., stout; calyx very large. *Flowers* of both sexes much larger than in the preceding species.—DISTRIB. Europe, N. Africa, W. Asia; introd. in N. America.—The most virulent British nettle.

VAR. 1, *pilulif'era* proper; leaves deeply serrate.—VAR. 2, *Dodar'tii,* L. (sp.); leaves entire or nearly so.

2. PARIETA'RIA, *Tournef.* PELLITORY.

Herbs, rarely shrubs. *Leaves* alternate, quite entire, exstipulate. *Flowers* clustered or cymose, polygamous, 1–3-bracteate. *Calyx* of male 4-partite, valvate in bud; of female tubular 4-fid. *Stamens* 4. *Style* long or short, stigma papillose. *Fruit* included in the enlarged calyx. —DISTRIB. Temp. and trop. regions species 8.— ETYM. *paries,* from growing on *walls.*

1. **P. officina'lis,** *L.*; leaves triple-nerved. *P. diffusa,* Koch.

Old walls and hedgebanks, &c., from Forfar southwards; fl. June–Oct.— Perennial, pubescent with curled hairs. *Rootstock* short, woody. *Stems* 1–2 ft., tufted, erect (var. *erecta,* Lond. Cat. not Koch), or decumbent (*P. fallax,* Gren. and Godr.), terete; branches slender, leafy. *Leaves* ½–4 in., elliptic-lanceolate or ovate, obtuse or acute, petiole slender. *Flowers* in

axillary clusters, mostly 2-sexual, in a 3-6-lobed few-flowered involucre. *Calyx* elongate and tubular after flowering.—DISTRIB. Europe, N. Africa, W. Asia.

ORDER LXXI. CANNABI'NEÆ.

Annual or perennial, erect or twining herbs; juice watery. *Leaves* opposite, or the upper alternate, simple or compound, stipulate, often glandular. *Flowers* minute, dioecious.—MALE racemed or panicled. *Sepals* 5, free, imbricate in bud. *Stamens* 5, adnate to the base of the sepals; anthers oblong, basifixed, dehiscing in front.—FEMALE in cones or fascicled, bracteate and bracteolate. *Sepal* 1, membranous, bract-like. *Ovary* free, compressed; styles 2, subulate, stigmatic all over; ovule 1, pendulous, campylotropous, micropyle superior. *Fruit* dry, indehiscent, enclosed in the sepal. *Seed* pendulous, testa coriaceous, inner coat thin, albumen 0; embryo coiled or curved, radicle superior.—DISTRIB. N. temp. and trop. regions; genera 2; species 3.—AFFINITIES. With *Urticeæ*.—PROPERTIES. Bitter, aromatic, narcotic; fibre tenacious.

1. HU'MULUS, *L.* HOP.

Twining, perennial. *Leaves* lobed; stipules connate.—MALE fl. in lax panicles.—FEMALE in pairs in the bracts of the catkin. *Stamens* erect; anthers dehiscing by subterminal slits. *Embryo* a flat spiral.—DISTRIB. N. temp. regions; species 2.—ETYM. doubtful.

1. **H. Lu'pulus,** *L.*; bracts of catkins much enlarged scarious.

Hedges and copses from York southwards; introd. in Scotland, where it ascends to 1,000 ft. in the Highlands; rare and not indigenous in Ireland; fl. July–Aug.—*Rootstock* stout, branched. *Stems* tall, scabrid, almost prickly, very tough; branchlets glabrate. *Leaves* 3–4 in. diam., cordate, petioled, uppermost ovate, the rest palmately 3–5-lobed to the middle; lobes ovate, acutely toothed. *Male fl.* ¼ in. diam., in panicles 3–5 in.; *female* in catkins ½ in. diam., on curved peduncles ½–1 in.; stigmas purple. *Fruiting catkin* 1½ in., broadly ovoid or subglobose, yellow; scales orbicular, covered with resinous glands at the base, as are the bracteoles and fruit.—DISTRIB. Temp. Europe, Asia, N. America.—Catkins used in brewing; the young blanched foliage is a good pot-herb.

ORDER LXXII. ULMA'CEÆ.

Trees or shrubs; juice watery. *Leaves* alternate, simple, distichous, oblique, scabrid; stipules caducous. *Flowers* 2-sexual, fascicled, lateral. *Calyx* campanulate, 4–5- or 8–9-fid, imbricate in bud, persistent. *Stamens* 4–5 or 8–9, adnate to the calyx-tube; anthers fixed by the back, bursting outwards. *Ovary* free, 1–2-celled; styles 2, subulate, stigmatic on the inner face; ovule 1 in each cell, pendulous, anatropous. *Fruit* dry, 1-seeded, winged or not. *Seed* pendulous, testa thin, albumen 0; embryo straight, cotyledons large flat or folded, radicle superior.—DISTRIB. N. temp. zone; genera 3–4; species about 18.—AFFINITIES. With *Urticeæ*.—PROPERTIES. Bitter, mucilaginous, astringent.

1. UL'MUS, *L.* ELM.

Ovary 2-celled. *Samara* winged all round. *Cotyledons* flat.—DISTRIB. Of the Order; species about 13.—ETYM. The Latin name.

1. **U. monta'na,** *Sm.*; seed in the centre of the oblong or suborbicular samara. *U. campestris,* L. herb.; *U. stricta* and *glabra,* Lindl. *U. major,* Sm. *Scotch, Wych, or Mountain Elm.*

Woods, indigenous in the N. of England and Scotland, and perhaps in N.E. Ireland; naturalized elsewhere; ascends to 1,300 ft. in Yorkshire; fl. March–April.—A large tree, 80–120 ft., trunk attaining 50 ft. in girth; branches long, spreading, weeping or horizontal, bark corky or not; twigs pubescent. *Root* sending up suckers, chiefly when cut. *Leaves* 3–6 in., often 3 in. diam., ovate-oblong, cuspidate, doubly and trebly serrate, unequally rounded or cordate at the base. *Calyx* ¼ in., ciliate, lobes obtuse. *Stamens* 4–6; anthers purple. *Samara* ½–1¼ in., very variable in breadth and the depth of the notch.—DISTRIB. Europe, Siberia.

U. CAMPES'TRIS, *Sm.*; seed above the centre of the obovate or oblong samara. *U. suberosa,* Ehr.; *U. minor* and *glabra,* Miller; *U. carpinifolia,* Lindl. *Common Elm.*

Woods and hedgerows, rarer in Scotland; ascends to 1,000 ft. in Yorkshire; a denizen, *Watson;* fl. March–May.—A very large tree, 125 ft., trunk 40–50 ft. in girth; bark rugged. *Root* sending up abundant suckers. *Branches* spreading, but not so horizontally as in *U. montana;* twigs less downy, often corky. *Leaves* smaller, 2–3 in., less cuspidate, often narrow at the base. *Calyx* smaller. *Stamens* often 4. *Samara* ½–¾ in. usually obovate. *Seed* not ripening in England.—DISTRIB. Mid. and S. Europe, N. Africa, Siberia.—An extremely variable tree. Many vars. of the and the preceding are described, but in the absence of authentically named trees are little deserving of attention.

ORDER LXXIII. SALICI'NEÆ.

Trees or shrubs. *Leaves* alternate, simple, deciduous, stipulate. *Flowers* dioecious, in catkins which usually precede the leaves. *Perianth* 0. *Disk* annular urceolate or glandular.—MALE. *Stamens* 1 or more, inserted under the disk, filaments free or connate; anthers basifixed, bursting inwards.—FEMALE. *Ovary* sessile or pedicelled, 1-celled; styles 2, short, stigmas 2 entire or 2–4-lobed; ovules many, on 2 parietal placentas, ascending, anatropous, raphe dorsal. *Capsule* 1-celled, loculicidal; valves 2, rolling back, many-seeded. *Seeds* minute, testa membranous, funicle short, with a pencil of silky hairs that conceals the seed, albumen 0; embryo straight, cotyledons plano-convex, radicle inferior.—DISTRIB. Arctic and N. temp. zones, rare in the tropics and S.; absent from Australia, and the Pacific; genera 2; species 180.—AFFINITIES. Very obscure.—PROPERTIES. Bitter, astringent, febrifuge, aromatic.

Leaves broad. Catkins drooping, scales cut.....1. Populus.
Leaves usually narrow. Catkins erect, scales entire.....2. Salix.

1. POP'ULUS, *Tournef.* POPLAR.

Catkins drooping; scales crenate lobed or cut. *Disk* oblique, cupular. *Stamens* 4–30, filaments free. *Stigmas* slender, 2–4-cleft.—DISTRIB. N. temp. regions; species 18.—ETYM. The Latin name.

SECTION 1. **Leu'ce.** Young shoots pubescent. *Fruiting catkins* dense; scales ciliate. *Stamens* 4–12. *Stigmas* with 2–4 linear lobes.

1. **P. al'ba,** *L.*; buds not viscid, leaves of shoots more or less lobed, of branches broadly ovate-cordate sinuate-lobed white and cottony beneath.

Moist woods, river-banks, &c.; fl. March–April.—A large tree, 60–100 ft.; bark grey, smooth; wood white; branches spreading, buds cottony; suckers many, with large deltoid-ovate lobed and toothed leaves 2–4 in. diam. *Leaves* on the branches 1–3 in., glabrous in age; petioles very long, slender, compressed. *Catkins* 2–4 in., cylindric; female shorter. *Stamens* 6–10; anthers purple. *Capsules* ¼ in., narrow ovoid.—DISTRIB. Europe from Gothland southwards, N. Africa, N. Asia, W. Asia to the N.W. Himalaya.—Wood light, useful, does not burn easily.

Sub-sp. AL'BA proper; leaves of the suckers lobed, of the branches white and cottony beneath. *White Poplar, Abele.*—A doubtful native, cultivated as far N. as Forfar, but does not flower in Scotland?

Sub-sp. CANES'CENS, *Sm.* (sp.); leaves of the suckers angled and toothed, of the branches hoary beneath or glabrous. *Grey Poplar.*—Indigenous in the S.E. of England.—Wood said to be superior to that of *P. alba* proper.

2. **P. trem'ula,** *L.*; buds not viscid, leaves of shoots cordate acute entire, of branches suborbicular-ovate sinuate-serrate with incurved teeth glabrous or silky beneath. *Aspen.*

Copses, &c., indigenous, but more often planted; ascends to 1,600 ft. in Yorkshire; fl. March–April.—Erect, 40–80 ft., short-lived. *Bark* grey, wood white; suckers many, pubescent; branches spreading; buds pubescent. *Leaves* 1–4 in., versatile, old obtuse, young acute, cottony beneath; petiole very long, slender, glabrous, compressed. *Catkins* 2–3 in., cylindric; scales laciniate. — DISTRIB. Europe (Arctic), N. Africa, N. Asia. — Wood indifferent.

SECTION 2. **Aigei'ros.** Young shoots glabrous. *Fruiting catkins* lax; scales subglabrous. *Stamens* 8–30. *Stigmas* 2-fid, short, cuneate.

P. NI'GRA, *L.*; buds viscid, leaves rhombic deltoid or suborbicular finely crenate-serrate at length glabrous. *Black Poplar.*

Moist places, river-banks, &c.; not indigenous; fl. April.—Erect, 50–60 ft., of very rapid growth and short duration. *Bark* grey; wood soft, white; branches spreading, buds glabrous. *Leaves* 1–4 in., angles rounded, acuminate, young silky beneath and ciliate; petiole slender, compressed. *Male catkin* 2–3 in., cylindric; female shorter, ascending, peduncle curved in fruit; scales shortly cut. *Stamens* 12–20; anthers purple. *Capsules* ¼ in., ovoid, pedicelled, recurved.—DISTRIB. Europe, N. Asia. Wood light, much used for carving, charcoal, &c.; bark for tanning.

2. SA'LIX, *Tournef.* WILLOW.

Trees or shrubs. *Leaves* quite entire or serrate; stipules persistent or deciduous. *Stamens* 2 or more, filaments free or connate. *Catkins* erect; scales entire. *Stigmas* entire or 2-fid.—DISTRIB. of the Order; species 160. —ETYM. The Latin name.—For the species of this troublesome genus I have followed Andersson, and for the vars., Syme.

SECTION 1. *Catkins* on short peduncles that bear fully developed leaves; scales pale, persistent or deciduous. *Filaments* hairy below, all free. *Capsule* glabrous in the British species.

* *Stamens* 3 *or more, free. Petiole glandular at the tip. Capsule pedicelled.*

1. **S. trian'dra,** *L.*; leaves linear- or oblong-lanceolate acuminate glandular-serrate glabrous paler or glaucous beneath, disk of the male flower 2-glandular, stamens 3. *Almond-leaved or French Willow.*

River-banks and osier-grounds from Perth southwards, and in Ireland, often planted; fl. April–June.—A tree, 20 ft., bark flaking. *Leaves* 2–4 in.; stipules large, ½-cordate. *Catkins* 1–2 in., appearing with the leaves, slender, female narrower; scales nearly glabrous. *Capsule* small, pedicelled, glabrous; style thick, short.—DISTRIB. Europe (Arctic), N. Asia.

VAR. 1, *trian'dra* proper; twigs terete, leaves more linear narrow glaucous beneath.—VAR. 2, *Hoffmannia'na,* Sm. (sp.); twigs terete, leaves broader at the base green beneath.—VAR. 3, *amygdali'na,* L. (sp.); twigs furrowed, leaves rounded at the broad base glaucous beneath.—*S. contorta,* Crowe, is another variety cultivated in Sussex.

S. LANCEOLA'TA, *Sm.* distinguished from *S. triandra* by its shaggy scales and distinctly developed style, appears to me a good species (*Baker*).

This is one of the common willows cultivated for basket-work. It is not indigenous, whether it be a good species, or, as Andersson supposes, a smooth-fruited hybrid between *triandra* and *alba,* or *viminalis.*

2. **S. pentan'dra,** *L.*; leaves elliptic or ovate- or obovate-lanceolate acuminate glandular-serrulate viscid shining paler beneath, disk of male and female flower 2-glandular, stamens 5 (4–12). *Bay-leaved Willow.*

River-banks and wet places, from Argyle and Moray southwards; ascends to 1,300 ft. in Northumberland; rare in Ireland; fl. May–June.—A glabrous shrub, 6–8 ft., or tree, 20 ft.; bark brown. *Leaves* 1–4 in., fragrant, reticulate below; stipules ovate oblong or 0. *Catkins,* male 1–2 in., erect then pendulous, scales oblong; female shorter. *Capsule* pedicelled, glabrous; style short.—DISTRIB. Europe (Arctic), excl. Greece and Turkey, W. and N. Asia.—The latest-flowering willow.—*S. cuspidata,* Schultz (*Meyeriana,* Willd.), found in Shropshire, is probably a hybrid between *pentandra* and *fragilis.*

** *Stamens* 2, *rarely more, free. Petiole glandular or not at the top.*

3. **S. frag'ilis,** *L.*; leaves lanceolate long-acuminate glabrous glandular-serrate pale or glaucous beneath, young pilose, stipules ½-cordate deciduous, capsule pedicelled. *Crack Willow, Withy.*

Marshy ground, from Mid. Scotland southwards; ascends to 1,300 ft. in Northumberland; not a native of Ireland; fl. April–May.—A large tree, 80–90 ft., trunk sometimes 20 ft. in girth; branches spreading obliquely from the trunk; twigs very fragile at the junction, smooth, polished. *Leaves* 3–6 in., petiole often glandular at the top. *Catkins* usually spreading, appearing with the leaves, stout; male 1–2 in., female slender, often longer; scales linear-lanceolate; disk 2-glandular; stamens 2, rarely 3–5. *Capsule* glabrous; style short.—DISTRIB. Europe, Siberia, W. Asia; introd. in America.—Andersson doubts this being indigenous, except in S.W. Asia.

VAR. 1, *frag'ilis* proper; twigs yellow-brown, leaves elliptic-lanceolate.—VAR. 2, *decip'iens,* Hoffm. (sp.); twigs orange or crimson, leaves smaller.

S. Russellia'na, Sm. (*Bedford Willow*), a tree 50 ft., trunk 12 ft. in girth, is considered a hybrid between *fragilis* and *alba*, and referred to *S. viridis*, Fries. Mr. Baker, however, regards it as not even a var. of *S. fragilis*; and considers Fries' *S. viridis* to be different, and not a British plant.

4. **S. al'ba**, *L.*; leaves narrowly lanceolate long-acuminate silky on both sides (except when old) glandular-serrate, stipules ovate-lanceolate deciduous, capsule subsessile. *White Willow.*

Marshy ground, from Sutherland southwards; a doubtful native of Ireland; fl. May.—A large tree, 80 ft., trunk 20 ft. in girth; bark fissured; twigs not fragile at the forks, silky. *Leaves* 2–4 in., glabrous when old, petiole eglandular. *Catkins* appearing with the leaves, slender, lax, erect, scales linear. *Filaments* hairy below the middle. *Capsule* glabrous, style very short.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to N.W. India.—Timber most useful for carpentry and fuel; bark used for tanning.

VAR. 1, *al'ba* proper; twigs olive, old leaves silky on both surfaces.—VAR. 2, *cæru'lea*, Sm. (sp.); twigs olive, old leaves glabrous, glaucous beneath.—VAR. 3, *vitelli'na*, L. (sp.); twigs yellow or reddish, old leaves glabrous above, scales of catkins longer. *Golden Willow.*

SECTION 2. *Catkins* on leafy or bracteate peduncles; scales persistent, discoloured at the tip (except *S. reticulata*). *Stamens* 2, filaments glabrous free. *Disk* 1-glandular. *Capsule* tomentose or silky, rarely glabrous.

* *Capsule with a slender pedicel; style very short or* 0.

5. **S. Capre'a**, *L.*; leaves elliptic or oblong-obovate or -lanceolate acute or acuminate crenate reticulate on both surfaces tomentose below, stipules ½-reniform, catkins silky, male ovoid-oblong, female elongate at length nodding, scales pilose, tip black. *Common Sallow, Goat-willow.*

Copses, pastures, &c., by streams, from Inverness southwards; ascending to 2,000 ft. in the Highlands; fl. April–May.—A silvery tree or large shrub. *Leaves* 2–4 in., dark green above, cuspidate, margins narrowly recurved. *Catkins* short, preceding the leaves, sessile, bracteate; male 1 in., very stout, female lengthening to 3 in. *Filaments* glabrous. *Capsule* ½ in., silky; pedicel very slender.—DISTRIB. Europe, N. Asia, W. Asia to the Himalaya.—The earliest flowering British willow. The twigs with catkins gathered at Easter, are called Palm-branches. Andersson points out the impossibility of distinguishing this from *S. cinerea*, L.

Sub-sp. CAPRE'A proper; buds and twigs glabrous or puberulous, leaves usually broad glabrous and dull green above.—VAR. 1, leaves undulate crenate-serrate, stipules long.—VAR. 2, leaves almost entire, stipules 0. A small bush, not uncommon in Highland gullies.

Sub-sp. CINE'REA, *L.* (sp.); buds and twigs tomentose, leaves smaller narrower from elliptic-oblong to oblanceolate undulate at the margins pubescent above, male catkins less stout opening later, anthers paler yellow, capsule smaller (filaments pilose at the base, *Syme*).—VAR. 1, *cine'rea* proper; leaves oblong-lanceolate glaucous, hairs beneath often red-brown, stipules large.—VAR. 2, *aquat'ica*, Sm. (sp.); leaves more obovate glaucous, hairs beneath white, stipules large.—VAR. 3, *oleifo'lia*, Sm. (sp.); leaves narrow rigid glaucous, hairs beneath red-brown, stipules small.—Andersson correctly refers the *S. cine'rea* of Smith in *Eng. Bot.* (t. 1897) to this; but also quotes that plate and name under *daphnoi'des*, Vill., a very different plant.

6. **S. auri'ta**, *L.*; leaves obovate-oblong rarely oblanceolate crenate

much wrinkled pubescent and reticulate beneath, stipules reniform, catkins short dense-flowered, male ovoid, female cylindric.

Moist copses, heaths, &c.; ascending to 2,000 ft. in the Highlands; fl. April-May.—A small bush, 2–4 ft., with straggling branches; probably a form of *S. Caprea*, being so closely allied to sub-sp. *cinerea* that it is chiefly distinguishable by its smaller size, reddish twigs, leaves rarely 2 in., very much wrinkled, young reddish and crisped, often petioled, large stipules, shorter catkins, ½–¾ in., and narrower more tomentose capsule.—DISTRIB. Europe, Siberia, W. Asia.

7. **S. re'pens,** *L.*; leaves small oblong- or linear-lanceolate obtuse or acute, margin recurved entire or serrulate shining and reticulate above, silky or glaucous beneath, stipules 0 or lanceolate, catkins cylindric-oblong, scales spathulate, anthers at length black. *S. fœtida*, Sm.

Heaths, commons, &c. from Argyle and Aberdeen southwards; ascending to 2,500 ft. in the Highlands; fl. April-May.—A small, straggling bush; branches slender, elongate, erect or decumbent; buds silky. *Leaves* excessively variable, ½–1½ in., young always silvery silky. *Catkins* preceding or appearing with the leaves, erect, short, sessile, rarely on lengthening leafy peduncles ½-1 in., bracts leafy; scales yellow-green or purple, silky, always dark at the tip; anthers yellow till the pollen is shed. *Capsule* pedicelled, glabrous or silky.—DISTRIB. Europe, Siberia.—The following are the chief British forms.

VAR. 1, *repens* proper; stems decumbent below, flowering branches erect or ascending, leaves appearing with the flowers elliptic-oblong quite entire silky beneath tip straight, stipules 0, capsule glabrous.—VAR. 2, *fusca*, L. (sp.); stem suberect, branches spreading, leaves elliptic-oblong faintly serrate tip straight; the rest as in var. 1.—VAR. 3, *prostrata*, Sm. (sp.); prostrate, branches many slender, leaves appearing after the flowers faintly serrate puberulous above glaucous and silky beneath, stipules minute or 0, capsule silky.—VAR. 4, *ascendens*, Sm. (sp.); stem decumbent, branches ascending, leaves as in var. 3 but appearing with the flowers more silky beneath and tips recurved, stipules ovate or lanceolate or 0, capsule silky at length glabrous.—VAR. 5, *parvifolia*, Sm. (sp.); stem as in var. 3, leaves and capsules as in var. 4, stipules small ovate or 0.—VAR. 6, *argentea*, Sm. (sp.); stem and simple slender branches erect, leaves appearing with the flowers elliptic-ovate quite entire densely silky and silvery especially beneath, tip recurved, capsule silky. A large form, growing in sandy places.—VAR. 7, *rosmarinifolia*, L. (sp.); leaves 2-3 in., linear or linear-lanceolate faintly glandular-serrate or entire glabrous or silky beneath, stipules ovate or lanceolate, catkins short sessile dense, scales black, capsule tomentose. Said to have been found in the last century by Sherard in bogs in Scotland.

S. ambigua, Ehr. (*S. incubacea*, L.; *S. repens*, var. *incubacea*, Symo), is a hybrid between *S. aurita* and *S. repens* (Andersson), remarkable for the reticulate leaves with recurved margins and large stipules.—*S. spathulata*, Willd., is referred by Andersson to a hairy form of this.

** *Capsule with a slender pedicel; style distinct.*

8. **S. nigricans,** *Sm.*; leaves thin ovate-oblong cordate or lanceolate subacute reticulate above, stipules 0 or ½-cordate, catkins sessile or on short leafy peduncles ovoid or cylindric, scales linear-oblong pilose.

Rocks and banks of streams, from Aberdeen southwards to Norfolk and Hereford; ascends to 2,300 ft. in the Highlands; rare in Ireland; fl. May-June.

—A procumbent shrub or tree, 10 ft. *Leaves* entire or serrate, black when dry. *Catkins* ½–1 in., appearing before or after the leaves, scales acute or obtuse; filaments hairy at the base. *Capsule* narrowly conical, glabrous or tomentose; pedicel and styles slender.—DISTRIB. N. and Alps of Mid. Europe. Andersson describes this as the most variable of the genus. It is perhaps a form of *S. phylicifolia*, which presents a parallel series of variations. Syme sums up its differences as consisting in the thinner more reticulate darker leaves, more or less glaucous beneath, blackening more when dry, and more permanently hairy; more pubescent twigs; large stipules; more glabrous capsule; shorter style and longer pedicel.

Mr. Baker's experience of the general habit of the two is:—*phylicifolia*, twigs bright chesnut, rarely hairy; leaves firmer brighter coloured above glaucous (very rarely not) quite glabrous beneath; stipules of the leaf-shoots smaller and more deciduous; whole plant drying without turning black:—*nigricans*, twigs much shorter, dull-coloured, pubescent (like *cinerea*); leaves softer; usually grey-pubescent and much less if at all glaucous below; stipules of barren shoots larger, more persistent; style and pedicel the same in both, and ovary similarly variable in silkiness; plant turning black when dried. Both, when growing with *Caprea* and *cinerea*, flower a little later (through May into June), and are mostly plants of subalpine valleys.

The erect varieties with broad leaves 1–4 in., more or less glaucous beneath, and silky capsules are:—True *nigricans*; *cotinifolia*, Sm.; and *Forsteriana*, Sm.—*S. rupestris*, Sm., is a trailing variety with small broad leaves.—*S. Andersoniana*, Sm.; *damascena*, Forbes, and *petræa*, G. Anders., are erect shrubs with glabrous capsules.—*S. hirta*, Sm., is a subarborescent form (male only) with silky twigs and leaves densely pubescent beneath.—*S. floribunda*, Forbes (*tenuifolia*, Sm.; *bicolor*, Hook.), is a doubtful plant.

9. **S. phylicifo'lia**, *L.*; leaves ovate-oblong or elliptic-lanceolate quite glabrous shining above glaucous beneath, stipules 0 or very small, catkins sessile bracteate, scales linear-oblong black acute. *Tea-leaved Willow.*

Rocks and mountain streams, from Cheshire and Lancashire northwards; ascending to 2,000 ft. in the Highlands; abundant in Yorkshire and the Breadalbane range; rare in Ireland; fl. April–May.—A very handsome large bush or small tree (10 ft.). When fully developed, conspicuous from its spreading shining chesnut or reddish branches, and glistening green and glaucous foliage; it resembles *S. nigricans* so closely in the size and all characters, that the varieties of each are often undistinguishable. Andersson thus sums up their differences: Leaves of *phylicifolia* less unequal, thicker, blacken less in drying, and have no minute white dots; capsule larger, with longer beaks: he adds that it is the earliest flowerer of the genus (in England *S. Caprea* flowers first); Syme, on the other hand, says it is amongst the latest!—DISTRIB. Almost the same as *S. nigricans*.

The British forms described as species are, 1st, the erect with silky capsules, *S. Davalliana*, Sm.; *Weigeliana*, Willd. (*Wulfeniana*, Sm.); *nitens*, G. Anders.; *Croweana*, Sm.; *Dicksoniana*, Sm. (*myrtilloides*, Sm. not L.); and *tenuior*, Borr.—2d, erect with glabrous or nearly glabrous capsules, *laxiflora*, G. Anders.; *propinqua*, Borr.; *tetrapla*, Walker; *Borreriana*, Sm.; *phillyreæfolia*, Borr.; *tenuifolia*, Borr.—3d, a more or less decumbent rooting form, with silky capsules, *S. radicans*, Sm. (*phylicifolia*, Sm.).

S. laurina, Sm. (*laxiflora*, Borr.; *bicolor*, Sm.), a small handsome tree, 20–30 ft., found in various parts of England and Ireland, is, according to Andersson, probably a hybrid between S. *phylicifolia* and *Caprea*.

**** Capsule with a short pedicel or* 0. *Style slender.*

S. DAPHNOI'DES, *Vill.*; arboreous, buds large, leaves narrow oblong or linear-lanceolate acuminate acutely serrate shining above glaucous beneath, stipules ½-cordate acute, catkins stout sessile, scales black acute very villous, capsules glabrous. *S. acutifolia*, Willd. *Violet Willow.*

Great Ayton, Yorkshire, not indigenous; fl. April.—A small tree, 10–12 ft., twigs violet. *Leaves* 3–6 in., very acuminate, with persistent glaucous bloom. *Catkins* clothed with silky hairs, appearing before the leaves; scales black-pointed; anthers yellow.—DISTRIB. S. Scandinavia across Europe and Asia to the Amur.

10. **S. vimina'lis,** *L.*; leaves linear-lanceolate acuminate reticulate above silvery silky beneath, margin revolute quite entire, stipules linear-lanceolate, catkins sessile, bracts small or 0, capsules tomentose. *Osier.*

Wet places and osier beds, from Elgin and Harris southwards; Ireland, doubtfully native; fl. April–June.—A shrub or small tree, 30 ft.; branches long, straight, young silky, old polished, leafy. *Leaves* 4–10 in., narrowed into the petiole, margins waved. *Catkins* ¾–1 in., opening long before the leaves, golden-yellow; scales oblong, brown; disk a slender gland. *Capsule* shortly pedicelled, base broad, white; stigmas rarely 2-fid.—DISTRIB. Russia, N. Asia, Soongaria; cult. throughout Europe; introd. in N. America.

S. STIPULA'RIS, *Sm.*, is a supposed hybrid, probably between *viminalis* and *Caprea* or *cinerea*, cultivated in Essex and Suffolk; it has broader more undulating leaves, large stipules, and a shortly pedicelled capsule.—In Britain this and *Smithiana* shade off into *viminalis*, and keep quite distinct from *cinerea* (Baker).

S. SMITHIA'NA, *Willd.* (*S. mollissima*, Sm.); this Andersson regards as an undoubted and excessively variable hybrid between *viminalis* and *Caprea*; it is very common in osier-grounds of England and Ireland, and found in Scotland; the leaves are not so silvery beneath, usually dull and hoary; capsule long pedicelled.—*S. acuminata*, Sm., and *S. ferruginea*, G. Anders. (*S. holoserícea*, Borr., *S. rugosa*, Leefe), are varieties.

11. **S. lana'ta,** *L.*; leaves broadly ovate or oblong-lanceolate acute woolly entire cottony beneath with raised reticulate veins, stipules large ½-cordate glandular-serrate, catkins terminal sessile, scales obtuse clothed with long golden hairs, capsules glabrous.

Alpine cliffs and rocky rills, very rare; Clova Mts., Glen Callater, and Maol Cuachlan in the Breadalbane Mts.; ascends to 2,700 ft.; fl. May–June.—A small shrub, 2–3 ft., with tortuous branches and tomentose twigs; buds large, black, hirsute. *Leaves* 1–3 in., coriaceous, petioles very short. *Catkins* appearing with the leaves, crowded, stout, sometimes ashy white as in *S. Lapponum*, especially in age; male 1–2 in., female 2–4 in.; scales black, oblong. *Stamens* glabrous. *Capsule* shortly pedicelled; style very slender, stigmas filiform, notched or 2-fid.—DISTRIB. Arctic and Alpine Scandinavia, Arctic Asia, Altai Mts., Groenland.

12. **S. Lappo'num,** *L.*; dwarf, leaves elliptic or obovate-lanceolate acuminate reticulate silky and villous above cottony beneath with straight raised veins, margins recurved, stipules 0 or small, catkins subsessile bracteate, scales acute clothed with long white hairs, capsules tomentose.

Wet alpine rocks in Scotland; ascending to 2,700 ft. from Edinburgh north-

wards; fl. June–July.—Shrubby, 2–3 ft., erect or decumbent; branches stout, brown, buds woolly. *Leaves* 1–2 in., very variable, quite entire or sinuate-serrate, dull green above; petioles rather long, dilated at the base. *Catkins* preceding the leaves; male ovoid, scales black, anthers yellow; female longer, 1–3 in. *Capsule* conical, subsessile; style very long, stigmas filiform, cleft.—DISTRIB. Mts. of France and N. Italy, Scandinavia to the Arctic circle, Siberia, N. America.—The Edinburgh specimens seen by me are flowerless; this locality is anomalous for so alpine a plant.

The following varieties differ by very slight and inconstant characters: *S. arena'ria*, Sm. (sp. and L. in part); leaves downy above woolly beneath, style equalling the capsule. *S. Stuartia'na*, Sm. (sp.); leaves woolly above silky and cottony beneath, style equalling the capsule. *S. glau'ca*, Sm. (sp. not L.); leaves snow-white and woolly beneath, style much shorter than the capsule. (I should doubt this being the same species.)

13. **S. Myrsini'tes,** *L.*; dwarf, leaves small rigid ovate obovate or lanceolate shining and reticulate on both surfaces glandular-serrate, stipules 0 or lanceolate, catkins on leafy peduncles, scales spathulate blackish, capsules pilose. *S. retusa*, Dickson (Andersson).

Moist rocks and rivulets in Braemar, Breadalbane and Clova Mts., ascending to 2,700 ft.; fl. June–July.—A small rigid suberect or creeping shrub, young parts clothed with silky deciduous hairs. *Leaves* usually ½–1 in., very variable, dark green and glossy; petioles very short; stipules ovate-lanceolate, serrate. *Catkins* ½–1 in., appearing with or after the leaves, on stout peduncles often as long, oblong, male ovoid; scales pilose, disk large; anthers at length black. *Capsule* pilose or pubescent, distinctly pedicelled; style long, stigmas thick.—DISTRIB. Alps of Scandinavia (Arctic), Austria, Germany and France, Siberia, N. America.—The following British varieties are enumerated.—VAR. 1, *procum'bens*, Forbes (sp.), (*S. lævis*, Hook.); leaves broad subacute faintly serrate.—VAR. 2, *arbutifo'lia*, Syme; leaves narrow acute or acuminate very faintly serrate.—VAR. 3, *serra'ta*, Syme; leaves ovate acute serrate.

S. Graha'mi, Borr. MS. (Baker in *Seem. Jour. Bot.* 1867, 157, t. 66), is a plant only known from female specimens cultivated in the Edinburgh Bot. garden said to have been brought by Prof. Graham from Frouvyn in Sutherland (Baker and Syme are mistaken in supposing that any of Borrer's specimens are indigenous.) It appears to me to be a form of *S. Myrsinites*, with smaller catkins, paler scales, and a perfectly glabrous capsule with a rather long very silky pedicel; and not at all allied to *S. polaris* or *herbacea*. Syme suspects it to be a hybrid between *herbacea* and *nigricans* or *phylicifolia*. The *Engl. Bot.* figures of the ovary and scale are very incorrect.

14. **S. Arbus'cula,** *L.*; leaves ovate-lanceolate or obovate acuminate serrulate shining above pale or glaucous beneath, catkins lateral on bracteate peduncles, scales obtuse hirsute, capsules sessile tomentose.

Rocks on the Mts. of Argyle, Perth, Forfar, and Aberdeen, ascending to 2,400 ft.; also in S. Scotland (Syme); unknown in Ireland; fl. June–July.—A small, rigid, decumbent, rooting shrub; twigs yellow, pubescent, then brown. *Leaves* ½–1½ in., very variable, at first silky beneath. *Catkins* ½–1 in., females often long-peduncled; scales obovate or rounded, reddish, very pubescent. *Capsules* conical, reddish, base embraced by the scale; style long, deeply cleft, stigmas thick notched.—DISTRIB. Alps of Mid. and

N. Europe to the Arctic circle, Siberia, Dahuria, Soongaria, Greenland.—Intermediate between *S. phylicifolia* and *Myrsinites.*

The British forms are: *S. carina'ta,* Sm.; suberect, leaves folded and recurved. —*S. prunifo'lia,* Sm.; decumbent or ascending, leaves flat.—*S. venulo'sa,* Sm.; decumbent, leaves reticulate on both surfaces. —*S. vaccinifo'lia,* Walker (*livida,* Sm. not Wahl); decumbent, leaves silky beneath.

**** *Capsule sessile or subsessile. Style short or* 0.

15. **S. herba'cea,** *L.*; very dwarf, stems buried, leaves oblong or orbicular obtuse or retuse shining reticulate serrate, catkins on 2-leaved peduncles oblong few-flowered, scales concave glabrous or pubescent.

Tops of the loftiest Welsh and N. English Mts., common on the Scotch Alps, ascending to 4,300 ft.; local in Ireland; fl. June.—A very small straggling shrub; stem and branches spreading horizontally under the turf, sending up short flowering few-leaved twigs; bud-scales persistent, brown. *Leaves* ¼–½ in., shortly petioled, curled; stipules minute ovate or 0. *Catkins* ⅛–¼ in., flowering after the leaves, 4–10-flowered, subterminal, shortly peduncled; scales obovate, obtuse; anthers yellow-brown or purple. *Capsule* rarely pubescent, subsessile; style rather short.—DISTRIB. Arctic and Alpine Europe, Siberia, Dahuria, N. America.—The smallest British shrub.

16. **S. reticula'ta,** *L.*; dwarf, depressed, stems buried, leaves orbicular, oblong or obovate strongly reticulate on both surfaces green above glaucous beneath, catkins on very long leafy peduncles, style very short.

Lofty Mts. of Breadalbane, Clova, Braemar, and Sutherland; ascending to 3,200 ft.; fl. July–Aug.—*Stem* 1–2 ft., procumbent, short, woody; branches tortuous, sparingly leafy. *Leaves* sometimes cuneate, obtuse or retuse, margin entire or waved, young pilose, older glabrous and rugose above, usually hoary beneath, stipules 0. *Catkins* ½–1 in., subterminal, flowering after the leaves, many-flowered, oblong; scales obovate, purplish or yellow, of one colour; anthers purplish; disk a laciniate cup. *Capsule* sessile, hoary, obtuse; stigmas notched.—DISTRIB. As *S. herbacea,* reaching the limits of Arctic vegetation.

SECTION 3. **Synan'dræ,** *Anderss. Catkins* appearing before the leaves, on short bracteate or leafy peduncles; scales tipped with dark colour. *Stamens* 2, filaments more or less combined.

17. **S. purpu'rea,** *L.*; shrubby, leaves often opposite; thin linear-lanceolate serrulate glabrous, stipules ½-ovate or 0, catkins subsessile, scales small, capsule subsessile, style very short. *Purple Osier.*

River-banks and osier-beds, from Perth and Isla southwards; doubtfully indigenous in Ireland; fl. March–April.—An erect or decumbent shrub, 5–10 ft.; twigs slender, tough; bark red or purple. *Leaves* 3–6 in., sparingly hairy when young, shortly petioled, broadest about or beyond the middle, glaucous but most so beneath, black in drying. *Catkins* ¾–1½ in., opposite or alternate, erect, then spreading or recurved, cylindric; scales purple-black above, hairy or woolly; filaments hairy at the base; anthers red, then black. *Capsule* broadly ovoid, obtuse; stigmas entire or cleft.—DISTRIB. Europe, N. Africa, Siberia, W. Asia to India; introd. in N. America.—Bark very bitter; used for basket-making, but not so commonly as *S. viminalis.*—The best-marked British varieties are 1, *Woolgariana,* Borr. (sp.,) and *ramulo'sa,* Borr.; erect, branches yellowish, stigmas notched.

2, *Lambertia'na*, Sm. (sp.); erect, leaves broader above, branches purplish glaucous, stigmas subsessile short thick.

S. ru'bra, Huds., a common osier-bed shrub, often becoming a tree 10 ft. high, is a hybrid between *purpurea* and *viminalis*, with the leaves silky beneath, filaments usually more or less free, and style longer; it is a very variable plant, and includes: 1, *rubra* proper; filaments connate at the base only; 2, *S. Forbyana*, Sm. (sp.), filaments united to the top; 3, *S. Helix*, L. (sp.), leaves often subopposite filaments united to the top: (bears fascicles of diseased leaves, owing to the puncture of a Cynips, hence called *Rose Willow*.)

S. Doniana, Sm. (sp.), a native of dry places in Mid. and S. Germany, described by Andersson as exactly intermediate between *repens* and *purpurea*, was stated by the late G. Don to be a native of Forfarshire, no doubt erroneously; it may be known from *purpurea* by its yellow anthers, pedicelled capsule, and filaments more or less connate at the base only.

ORDER LXXIV. CUPULIF'ERÆ.

Trees or shrubs. *Leaves* alternate, stipulate.—MALE fl. solitary or crowded, or in catkins, bracteate or not. *Sepals* 5 or more, unequal or 0. *Stamens* 5–20, aduate to the base of the sepals or of a concave bract; filaments slender, free or connate; anthers fixed by the back, 2-celled, bursting inwards.—FEMALE fl. sessile in an involucre formed of free or connate bracts. *Calyx* adnate to the ovary, about 6-toothed. *Ovary* inferior, more or less completely 2-3- (rarely more) celled; styles 2–3, stigmatose above; ovules 1 or 2 collateral, erect or pendulous, anatropous. *Fruit* (a glans) indehiscent, coriaceous or bony, 1- rarely 2-seeded, seated on or enclosed in the hardened or accrescent bracts (cupule). *Seed* large, testa thin often adherent to the pericarp, albumen 0; cotyledons thick, fleshy or farinaceous, often grooved or folded; radicle short, superior.—DISTRIB. N. hemisphere, from N. Africa, N. India, the Malay Is. and Darien northwards, Mts. of S. Australia, New Zealand, and Chili; genera 12; species about 260.—AFFINITIES. With *Juglandeæ* and *Betulaceæ*.—PROPERTIES. Yield tannin, many good woods, and esculent embryos.

SUB-ORDER I. **Querci'neæ.** MALE fl. *Sepals* 4–10. *Filaments* simple; anther-cells connate. FEMALE fl. 1–3 in an involucre of many bracteoles which enlarges in fruit. *Ovary* 3–7-celled; ovules 2 in each cell, with 2 integuments. *Fruit* seated in a cupule.

Male catkins slender. Styles 3, short.....1. Quercus.
Male catkins globose. Styles 3, filiform.....2. Fagus.

SUB-ORDER II. **Coryle'æ.** MALE fl. *Perianth* 0. *Stamens* included between 2 bracteoles, filaments often 2-fid; anther-cells separate, hairy at the tip. FEMALE fl. in pairs; bracteoles 2, enlarging in fruit. *Ovary* imperfectly 2-celled; ovules 2, pendulous from one placenta only, with two integuments. *Fruit* enclosed in the coriaceous bracts.

Female catkin minute, of few brown scales.....3. Corylus.
Female catkin large, of many leafy scales.....4. Carpinus.

1. QUER'CUS, *Tournef.* OAK.

Trees; buds scaly; hairs often stellate. *Leaves* evergreen or deciduous; stipules deciduous.—MALE fl. in catkins, with usually a caducous bract at

the base. *Calyx* 6–7-lobed. *Stamens* indefinite (10 in the British sp.), filaments slender exserted.—FEMALE fl. solitary. *Calyx* 3–8-lobed. *Ovary* 3-celled; styles 3. *Fruit* more or less ovoid, terete, 1-seeded; cupule of imbricating scales. *Seed* with the remains of the septa and undeveloped ovules attached to its upper or lower part; cotyledons included in the pericarp in germination.—DISTRIB. Of the Order, excl. the S. hemisphere; species about 250.—ETYM. The Latin name.

1. **Q. Ro'bur,** *L.*; leaves deciduous oblong-obovate sinuate-lobed.

Woods, &c.; once the chief forest tree of England; ascends to 1,350 ft. in the Highlands; fl. April–May.—*Trunk* 60 to 100 ft., 70 ft. in girth (Cowthorpe oak, Yorkshire); bark rugged; branches tortuous. *Leaves* 3–6 in., sessile or shortly petioled, narrowed rounded or cordate at the base, young pubescent beneath, plaited in bud. *Catkins* 1–3 in., appearing with the leaves, pendulous; bracts linear; flowers small in distant clusters; sepals pilose. *Acorns* ¾–1 in., 2–3 together; cupule with many appressed triangular obtuse imbricating scales.—DISTRIB. Europe, W. Asia from the Atlas, Taurus, and Syria, almost to the Arctic circle.

VAR. 1, *sessil'iflora*, Sm. (sp.); leaves petioled, peduncles very short.—VAR. 2, *pedun'culata*, Ehr. (sp.); leaves sessile, peduncles long.

2. FA'GUS, *Tournef.* BEECH.

Trees. *Leaves* deciduous or evergreen; stipules caducous.—MALE fl. long-peduncled. *Sepals* 5–7. *Stamens* 8–16, filaments slender, exserted; anthers oblong.—FEMALE fl. 1–3; involucre of 4 bracts. *Calyx* 6-toothed. *Ovary* 3-gonous, 3-celled; styles 3, linear; ovules 2 in each cell, pendulous from the top. *Fruits* usually 3 together, 1- rarely 2–3-seeded, compressed 3-gonous or 2–3-winged, enclosed in a hardened or coriaceous 4-lobed scaly involucre. *Seed* pendulous, crowned with the undeveloped ovules; cotyledons plaited, leafy after germination.—DISTRIB. Temp. Europe, N. Asia (excl. the Himalaya), N. and S. America, S. Australia, New Zealand; species 15.—ETYM. from *φάγω*, from the *eatable* seeds.

1. **F. sylvat'ica,** *L.*; leaves deciduous oblong-ovate obscurely toothed.

Woods, especially on chalk and limestone, from Cheshire southwards; planted in Scotland and Ireland, and up to 1,200 ft. in Yorkshire; fl. April–May.—*Trunk* 118 ft. (King's beech, Ashridge), and 29 ft. girth (Bicton, Devon); head 352 ft. diam. (Knowle beech); bark smooth, white; branches horizontal; buds acute. *Leaves* 2–3 in., shortly petioled, acuminate, silky when young; plaited parallel to the nerves in bud; stipules scarious. *Male fl.* capitate, pendulous; peduncle 1–2 in.; anthers yellow; female on shorter peduncles. *Cupule* ½ in., 4-cleft, segments bristly. *Fruit* 3-quetrous, smooth.—DISTRIB. A triangular area between Norway, Asia Minor, and Spain; Japan.—Wood used for tools, carpentry, and fuel; fruit yields oil.

3. CORYL'US, *Tournef.* HAZEL.

Shrubs or small trees. *Leaves* deciduous in bud. MALE *spikes* slender, pendulous. *Bracts* cuneate, with 2 bracteoles above their inner base. *Perianth* 0. *Stamens* 4 with 2-celled, or 8 with 1-celled anthers, filaments short. FEMALE fl. in pairs in each bract; bracteoles 2. *Fruit* woody, 1-celled, 1-seeded, enclosed in the greatly enlarged coriaceous more or less cut bract and bracteoles. *Cotyledons* included in the nut in germina-

tion.—DISTRIB. Temp. N. hemisphere; species 7.—ETYM. *κόρυς*, from the *cap*-like form of the involucre.

1. **C. Avella'na,** *L.*; leaves orbicular-cordate doubly serrate cuspidate.

Copses and hedges, ascending to nearly 1,900 ft. in the Highlands; fl. Feb.–March.—A glandular, hispid and pubescent shrub; rarely a tree 30 ft., with trunk 3 ft. girth at the ground (Eastwell Park, Kent). *Leaves* 2–4 in., distichous, unequal at the base, plaited parallel to the midrib in bud; petiole short; stipules oblong, obtuse. *Male catkins* 1–2 in., 2–4 in a racome, pendulous, bracts cuneate; female minute, subglobose, sessile. *Fruit* ½–¾ in., clustered, woody; involucre palmately lobed and cut, unarmed.—DISTRIB. Europe, N. Africa, Siberia, Dahuria.—Wood very elastic. Nuts yield abundance of bland oil.

4. CARPI'NUS, *Tournef.* HORNBEAM.

Trees. *Leaves* deciduous.—MALE. *Spikes* lateral; bracts ovate, acute. *Stamens* 6–12 in the axil of the bract, filaments slender; anther-cells separate, tips pilose.—FEMALE fl. *Spikes* terminal; bract 2-flowered, deciduous; flowers each in a lobed bracteole which enlarges after flowering. *Fruit* almost woody, nerved, 1-celled, 1-seeded, enclosed in the leafy lobed bracteole.—DISTRIB. N. temp. zone; species 4.—ETYM. The Latin name.

1. **C. Bet'ulus,** *L.*; leaves elliptic-ovate doubly serrate pilose beneath, female bracts 3-lobed 3-nerved mid-lobe much the longest.

S. counties of England, indigenous; planted N. of them and in Ireland; fl. May.—A small tree, but sometimes 70 ft., with the trunk (usually flattened) 10 ft. in girth; bark smooth, light-grey; wood close, white, heavy. *Leaves* 2–3 in., subdistichous, acute or acuminate, shortly petioled, plaited parallel to the nerves in bud; stipules large, linear-oblong. *Male catkins* 1–2 in., pendulous; bracts ovate-lanceolate, acute. *Female* 2–4 in., pendulous in fruit, cylindric; bracts 1–1½ in., entire or toothed. *Fruit* ¼ in., green, 7–11-nerved.—DISTRIB. Europe from Gothland southwards, W. Asia.—Wood the best fuel, very tough and difficult to work.

ORDER LXXV. BETULA'CEÆ.

Trees or shrubs. *Leaves* alternate, deciduous, stipulate. *Flowers* small, monœcious, 1–3 together in the axils of the scales of a terete or globose catkin.—MALE. *Scale* peltate, 2-bracteolate. *Sepals* 1 or more. *Stamens* usually one opposite each sepal, filament short simple or 2-fid; anthers basifixed, glabrous, cells connate or separate.—FEMALE. *Scales* sessile, entire or 3–4-lobed, persistent or deciduous. *Perianth* 0. Ovary compressed, 2-celled, stigmas 2 filiform; ovules solitary in each cell, pendulous from the septum, anatropous. *Fruit* not enclosed in the bracts, small, dry, indehiscent, 1–2-celled, cells 1-seeded. *Seed* pendulous, testa thin adherent to the pericarp, albumen 0; embryo straight, radicle superior, cotyledons flat, leafy in germination. — DISTRIB. N. temp. regions, S. America; genera 2; species 35.—AFFINITIES. With *Cupuliferæ* and *Myricaceæ*.—PROPERTIES. Bark yields tannin and oil, &c.

Scales of female catkin thin, deciduous ..... 1. Betula.
Scales of female catkin woody, persistent ..... 2. Alnus.

1. BET'ULA, *Tournef.* BIRCH.

Trees or shrubs.—MALE CATKIN. *Scales* peltate, with 2 bracts, and 3 flowers. *Sepals* 1–4. *Stamens* 2, filaments forked, separating the anther-cells.—FEMALE. *Bracts* imbricate, usually 3-lobed, 2–3-flowered; bracteoles 0. *Fruit* lenticular, winged or margined.—DISTRIB. N. temp. and Arctic regions; species about 25.—ETYM. The Latin name.

1. **B. al'ba,** *L.*; a tree, leaves long-petioled deltoid rhomboid or ovate acute doubly serrate, fruit broadly winged.

Woods and copses, especially in mountain districts; ascending to 2,500 ft. in the Highlands; fl. April–May.—A short-lived tree, 40–50 rarely 80 ft., trunk 8–10 in. diam.; bark flaking, silvery white; wood whitish; branches often weeping (*B. pendula,* Wahlb.). *Leaves* 1–3 in., sometimes pubescent, rather coriaceous, resinous or glandular when young; petiole slender; stipules broad. *Male catkins* ½–2 in., pendulous; sepal 1; female solitary shorter, suberect. *Scales of fruit* cuneate, brown, 3-lobed to the middle. *Fruit* orbicular, wing notched.—DISTRIB. Europe (Arctic), N. Asia, N. America (a variety).—Bark used in tanning, and yields a fragrant oil; juice sugary in spring, and a wine is made from it; wood durable.

Sub-sp. VERRUCO'SA, *Ehr.* (sp.); leaves truncate at the base, lateral lobes of fruiting bracts spreading.

Sub-sp. GLUTINO'SA, *Fries* (sp.); sometimes bushy, leaves rhomboid-ovate, lateral lobes of fruiting bracts erect.—VAR. 1, *denuda'ta;* leaves glabrous resinous.—VAR. 2, *pubes'cens,* leaves and twigs pubescent.

2. **B. na'na,** *L.*; bushy, leaves short-petioled orbicular-crenate, fruit very narrowly winged.

Mts. of Scotland, but not general; ascending to 2,700 ft.; fl. May.—Bush 1–3 ft. *Leaves* ¼–½ in., glabrous, dark green. *Catkins* ¼ the size of those of *B. alba.* *Bracts* of fruiting catkins broadly obcuneate, with 3 rounded lobes.—DISTRIB. Arctic and Alpine Europe (excl. Spain, Greece, and Turkey), N. Asia, N. America.

2. AL'NUS, *Tournef.* ALDER.

Trees or shrubs.—MALE CATKIN. *Scales* peltate, 3-flowered. *Sepals* and *stamens* 3–5; anthers 2-celled.—FEMALE broadly ovoid; scales fleshy, 2–3-flowered, each with 2–3 bracteoles or sepals adnate to the bract. *Fruiting catkin* woody; fruit compressed, winged or not, 1-celled, 1-seeded.—DISTRIB. Europe, Asia from the Himalaya northwards, N. America, Andes, Chili; species 14.—ETYM. The Latin name.

1. **A. glutino'sa,** *L.*; leaves obovate or orbicular-cuneate green on both sides, female catkins racemose.

River-banks, marshes, &c.; ascending to 1,600 ft. in the Highlands; fl. March–April.—A bush or tree, 20–40, very rarely 70 ft.; trunk 1–2 ft. diam.; bark black; wood white when alive, red when cut, then pale pink. *Leaves* 2–4 in., shortly petioled, glutinous and hairy when young, sinuate and serrulate; stipules ovate. *Catkins* appearing before the leaves; male 2–4 in., bracts orbicular, red; female ½–1 in., terminal, racemose, obtuse; bracts red-brown, woody. *Fruit* ⅛ in., pale, hardly winged.—DISTRIB. Europe, N. Africa, W. and N. Asia to Japan.—Wood soft, durable.

ORDER LXXVI. MYRICA'CEÆ.

Shrubs or trees, often with a glandular wax-secreting pubescence; buds scaly. *Leaves* alternate, simple, exstipulate (with one exception). *Catkins* axillary, simple or compound, 2-sexual with male flowers below, or 1-sexual. *Flowers* bracteate or not. *Perianth* 0.—MALE. *Stamens* 2–16, filaments free or connate; anthers basifixed, dehiscing outwards.—FEMALE. *Ovary* sessile, 1-celled; styles 2, lateral, filiform, stigmatic all over; ovule 1, sessile, basal, orthotropous. *Fruit* a papillose drupe with a 1-seeded stone, sometimes 2-winged from being adnate to the enlarged bracteoles. *Seed* erect, testa thin, albumen 0; cotyledons fleshy plano-convex, radicle superior.—DISTRIB. N. temp. zone, trop. Asia, S. Africa, N. America; genus 1; species 30.—AFFINITIES. Close with *Juglandeæ*.—PROPERTIES. Yield wax, resin, benzoic acid, and tannin.

1. MYR'ICA, *L.* SWEET-GALE, BOG-MYRTLE.

Character of the Order.—ETYM. The Greek name.

1. **M. Gale,** *L.*; leaves narrowly cuneate-obovate or -lanceolate serrate towards the tip, stamens ebracteolate, ovary 2-bracteolate.

Bogs and moors; ascending to 1,800 ft. in the Highlands; fl. May–July.—Shrub 2–3 ft., twiggy, suberect, resinous, fragrant. *Leaves* 2–3 in., rarely quite entire, obtuse or acute, very shortly petioled, often pubescent beneath. *Catkins* flowering before the leaves appear; male ½–1 in., racemose, crowded, erect; scales broadly ovate, concave, anthers red; female ¼ in., styles red. *Drupe* minute, lenticular, adnate to the persistent bracts.—DISTRIB. Europe, except Italy Greece and Turkey, N. Asia, N. America.—Much used in cottage-practice and for tea-making.

ORDER LXXVII. CONIF'ERÆ.

Trees or shrubs; wood without medullary rays or vascular tissue proper; wood-cells studded with disks. *Leaves* usually alternate, rigid, linear or subulate, solitary, or fascicled in membranous sheaths. *Flowers* monœcious or dioecious; males in deciduous catkins; females in cones; perianth 0.—MALE of many 1- or more-celled anthers seated on the scales of the catkin, filaments 0 or connate.—FEMALE 1- or more sessile naked orthotropous or anatropous ovules (carpels of some) seated on an open carpellary leaf (bract of some), which is adnate to the scale of the cone. *Seeds* often winged, testa thin or thick, albumen densely fleshy; embryo axile, straight, cotyledons 2 or more, radicle terete often attached to a crumpled thread (suspensor).—DISTRIB. Especially cold regions; very rare in trop. Africa and America; genera 33; species about 300.—AFFINITIES. With *Cycadeæ* and *Gnetaceæ*.—PROPERTIES. Yield terebinthine, succinic acid, pitch, tar, turpentine, valuable woods, and a few edible seeds.

TRIBE I. **ABIETI'NEÆ.** *Flowers* monœcious. *Cones* usually large, conical; scales more or less woody. *Pollen* curved.

Cone woody, scales persistent.....1. Pinus.

TRIBE II. **CUPRESSI'NEÆ.** *Flowers* mon-di-œcious. *Cones* usually globose or short, scales woody or fleshy, persistent. *Pollen* globose.

Cone fleshy, globose; scales connate.....2. Juniperus.

TRIBE III. **TAXI'NEÆ.** *Flowers* dicœcious. *Cones* much reduced; scales small, thin or coriaceous, the upper with 1 ovule. *Seed* hard, with a fleshy coat, or seated in a fleshy cup. *Pollen* globose.

Seed solitary, seated in a fleshy cup.....3. Taxus.

1. PI'NUS, *L.* PINE, FIR.

Trees; branches more or less whorled. *Leaves* evergreen, in clusters of 2, 3, or 5.—MALE CATKIN with membranous scales. *Anther* 1, 2-celled.—FEMALE CONE usually ripening in the second year; scales woody. *Ovules* 2, inverted, adnate to the bract; cotyledons 3 or more, linear; radicle inferior.—DISTRIB. N. hemisphere, from Mexico and Borneo to the Arctic circle; species about 110.—ETYM. The classical name.

1. **P. sylves'tris,** *L.*; leaves in pairs, cones ovoid, young recurved, seeds winged. *Scotch Fir.*

Highlands, ascends to 2,200 ft., rare in a native state; formerly native over many parts of Britain; fl. May–June.—A tree, 50–100 ft., trunk attaining 12 ft. girth; wood red or white; bark red-brown, rough. *Leaves* 2–3 in., acicular, acute, grooved above, convex and glaucous beneath, minutely serrulate, sheath fimbriate. *Male catkins* ¼ in., spiked, yellow; connective produced. *Female cones* 1–2 in., 1–3 together, acute; scales few, ends rhomboid with a transverse keel and deciduous point. *Seed* ½ in., wing cuneate, much exceeding the nucleus.—DISTRIB. Plains of N. and Mts. of S. Europe, Siberia, Dahuria.—Yields tar, pitch, rosin, turpentine, and deals.

2. JUNIP'ERUS, *L.* JUNIPER.

Trees or bushes; heart-wood red. *Leaves* opposite or whorled in threes, all subulate, or on the young shoots subulate, on the old scale-like and appressed. *Flowers* mon-di-œcious.—MALE CATKINS globose. *Anther* 1, 3–6-celled.—FEMALE CONE (a *galbulus*) ripening the 2d year, small, globose, of 4–6 decussate or whorled scales, which are fleshy in fruit, the upper and lower flowerless. *Ovules* 1–2, erect. *Seeds* 1–8, free or connate, small, testa bony; cotyledons 2–4, oblong; radicle superior.—DISTRIB. Temp. and cold N. hemisphere; species 27.—ETYM. The classical name.

1. **J. commu'nis,** *L.*; leaves in threes subulate pungent jointed on the branch glaucous above, margins and midrib thickened.

Open hill-sides, ascending to 2,400 ft., and var. *nana* to 2,700 ft. in the Highlands; fl. May–June.—Shrubby, 1–5 ft., rarely subarborcous (10–20 ft.); trunk attaining 5 ft. in girth. *Bark* flaking, fibrous, red-brown. *Leaves* ½–1 in., crowded, lower shorter, oblong-lanceolate, concave. *Cone* ¼–½ in. diam., very fleshy, blue-black, glaucous, with scarious empty scales at its bases.—DISTRIB. From the Atlas, Taurus, Himalaya, Japan, and Rocky Mts. to the Arctic regions.—A powerful diuretic.

VAR. 1, *commu'nis* proper; leaves spreading straight subulate.—VAR. 2, *na'na,* Willd. (sp.); leaves shorter broader imbricate incurved.

3. TAX'US, *Tournef.* YEW.

A tree or shrub; wood very tough, heart-wood red; wood-cells with a spiral line inside. *Leaves* linear, 2-farious, decurrent; petiole very short, with a half twist. *Flowers* usually dicœcious.—MALE CATKIN axillary,

very small, of several imbricate scarious empty scales, and one peltate 3-8-celled anther.—FEMALE CONE of a few minute scales, and 1 terminal erect ovule seated on a fleshy disk, which enlarges into a red fleshy cup containing the seed. *Seed* ovoid, subcompressed, testa bony; cotyledons 2, short, radicle superior.—DISTRIB. N. temp. regions from the Atlas, Taurus, Himalaya and Mexico to the Arctic circle.—ETYM. *τόξον*, from the wood being used in making *bows*.

1. **T. bacca'ta,** *L.*; leaves linear more or less falcate acute.

Rocky glens, hill-sides and woods, from Aberdeen and Argyle southwards; ascending to 1,500 ft. in Northumberland; rare in a native state; fl. March. —*Trunk* 15-50 ft. in England, much loftier in India; sometimes 27 ft. in girth (Hounslow), channelled; bark thin, flaking; branches spreading. *Leaves* ½-1½ in., coriaceous, shining above, paler beneath. *Male catkins* ¼ in., yellow; female minute; scales green. *Fruit* ½ in.; cup red, mucilaginous; seed olive-green, punctulate.—DISTRIB. Of the genus.—I believe the 6 supposed species of this genus to be forms of one. *T. fastigia'ta,* Lindl. (Irish or Florence-court yew), is a fastigiate variety.

CLASS II. MONOCOTYLE'DONS.

DIVISION I. PETALOI'DEÆ.

ORDER I. HYDROCHAR'IDEÆ.

Aquatic herbs. *Leaves* aërial floating or submerged, opposite or whorled, convolute in bud. *Flowers* usually dioecious, buds enclosed in one or more spathaceous bracts.—MALE. *Perianth* of 6 segments in 2 series (rarely 0), 3 inner often petaloid, imbricate or valvate in bud. *Stamens* on the base of the segments, 3 and opposite the sepals, or more and in 2 or more series, filaments free or connate below; anthers adnate. *Ovary* rudimentary.—FEMALE. *Perianth* superior, 6-partite. *Staminodes* various, sometimes antheriferous. *Ovary* 1- or 3-6-celled; styles 3 or 6, 2-fid, free or connate below, stigmas decurrent; ovules many, ascending. *Fruit* usually baccate, submerged, 1-6-celled. *Seeds* many or few, on pulpy projecting placentas, testa firm, albumen 0; embryo straight, plumule lateral, radicle next the hilum.—DISTRIB. All climates; genera 10; species about 20.—AFFINITIES. With *Alismaceæ.*—PROPERTIES unimportant.

Leaves orbicular floating.....1. Hydrocharis.
Leaves ensiform serrate submerged.....2. Stratiotes.
Leaves linear opposite or whorled, submerged.....2*. *Anacharis.*

1. HYDRO'CHARIS, *L.* FROG-BIT.

A floating herb. *Leaves* orbicular, quite entire.—MALE fl. 2-3, subumbelled; spathe peduncled, 2-leaved. *Sepals* 3, herbaceous. *Petals* 3,

white, membranous. *Stamens* 12, 3–6 without anthers, filaments connate below, forked, fleshy; anthers basifixed, cells separate, both on one fork. *Rudimentary ovaries* 3.—FEMALE, solitary, long-peduncled; spathe 1, radical. *Sepals* of the male. *Petals* with a fleshy gland at the base. *Staminodes* 6, filiform, in pairs opposite the sepals. *Ovary* ovoid, 6-celled; styles 6, short, connate at the base; ovules many, inserted on the septa, orthotropous. *Fruit* fleshy, indehiscent. *Seeds* few, ovoid, immersed in mucus, testa lax papillose; embryo ovoid.—DISTRIB. Europe except Turkey, Siberia.—ETYM. ὕδωρ, *water*, and χάρις, *elegance*.

1. **H. Morsus-Ra'næ**, *L.*; leaves orbicular-reniform, flowers white.

Ponds and ditches, from Northumberland southwards; rare and local in Ireland; fl. July–Aug.—Stoloniferous, roots fibrous and bulbiferous. *Leaves*, 1–1½ in. diam., deep green above, reddish below. *Flowers* erect, ¾–1 in. diam.; sepals small, oblong; petals broadly obovate, crumpled. *Fruit* I have not seen.—The cells of the testa swell in water and emit a spiral thread.

2. STRATIO'TES, *L.* WATER SOLDIER.

A stoloniferous submerged herb. *Leaves* all radical. *Flowers* subdioecious, submerged in bud, emersed when open. *Inflorescence* and *perianth* of *Hydrocharis*, but female flower sessile on a 2-spathed peduncle.—MALE fl. *Stamens* many, 12 antheriferous, the rest subulate; anthers linear.—FEMALE. *Staminodes* many, a few antheriferous. *Ovary* compressed with a narrow neck, and fruit as in *Hydrocharis*; ovules anatropous.—DISTRIB. Europe excl. Greece and Turkey, Siberia.—ETYM. στρατιώτης, *a soldier*, from the sword-like foliage.

1. **S. aloi'des**, *L.*; leaves tapering spinous-serrate.

Ponds and ditches in the E. of England from York to Suffolk, and in Lancashire and Cheshire; naturalized in E. Scotland and Ireland; fl. June–Aug. —*Leaves* 6–18 in., spreading, base ½–½ in. diam., rigid, brittle, deep green, many-nerved. *Peduncles* axillary, short, stout. *Flowers* 1½ in. diam. *Fruit* decurved at right angles to the peduncle, flagon-shaped, 6-gonous, green; carpels separating, full of mucus. *Seeds* with a mucous coat.

2*. *ANA'CHARIS*, *Rich.* WATER-THYME.

Stem slender, submerged, elongate, branched. *Leaves* in whorls of 3 (rarely 4), lower opposite. *Flowers* subdioecious, axillary, solitary, sessile; spathe tubular, slender, 2-lipped. *Sepals* and *petals* 3 each, small, green. —MALE. *Stamens* 3–9, filaments short or 0; anthers oblong.—FEMALE. *Tube of perianth* long, slender. *Staminodes* 3 or 6, sometimes antheriferous. *Ovary* 1-celled; style slender, adnate to the perianth-tube, stigmas 3; ovules orthotropous, few, placentas 3 parietal. *Berry* oblong, 1-celled, few-seeded.—DISTRIB. Temp. and trop. climates; species 2.—ETYM. ἄνα, *without*, and χάρις, *elegance*.

A. CANADEN'SIS, *Planch.*; leaves linear- or lanceolate-oblong serrulate. *A. Alsinastrum*, Bab.; *A. Nuttallii*, Planch.; *Udora*, Nutt.

Ponds, ditches, and streams, abundant, introduced from America into County Down about 1836, and into England about 1841, rapidly spreading; fl. May–Oct. Dark green, pellucid. *Stem* 1–4 ft., very brittle, toroto, rooting at the

nodes. *Leaves* ¼–½ in., sessile, acute, margined. *Flowers* resting on the surface of the water, ½ in. diam., greenish-purple, tube of female 4–8 in., capillary. *Sepals* boat-shaped. *Petals* recurved. *Stigmas* long, terete, notched. *Male* not hitherto found in England.—DISTRIB. N. America.

ORDER II. ORCHIDEÆ.

Terrestrial herbs, roots fascicled or tuberous (many exotics are epiphytes, with pseudo-bulbs). *Leaves* sheathing at the base, or scales. *Flowers* solitary, spiked, racemed or panicled. *Perianth* superior, irregular, of 6 coloured segments; 3 outer (*sepals*) nearly similar; 3 inner lateral (*petals*) like the sepals; lower inner (*lip*) dissimilar, usually larger, often spurred. *Stamens* confluent with the style into an unsymmetrical column; anther 1 opposite the lip (in *Cypripedium* 2 opposite the petals), 2-celled, persistent or deciduous; pollen in 2, 4, or 8 pyriform pedicelled masses (*pollinia*), pedicels (*caudicles*) terminating in a gland; glands exposed or in 1 or 2 pouches. *Ovary* usually long and twisted, 3-gonous, 1-celled; style often terminating in a beak (*rostellum*) at the base of the anther, stigma a viscid surface (of three confluent stigmas) facing the lip, beneath the rostellum, rarely 2-lobed; ovules very many, anatropous, placentas 3 parietal. *Capsule* 3-valved, valves separating from 3 septa. *Seeds* innumerable, very minute, fusiform, testa very lax reticulate, albumen 0; embryo fleshy.—DISTRIB. All climates and situations but maritime and aquatic; genera 400; species 3,000.—AFFINITIES. With *Irideæ*.—PROPERTIES. A few are aromatic (*Vanilla*): the tubers of *Orchis* are nutritive, and yield starch and salep.

TRIBE I. **OPHRYDEÆ.** *Anther* 1, confluent with the face of the style; cells 2, bursting vertically; pollen-masses 2, free or united by their glands, of many grains united by an elastic web.

* *Lip spurred. Stigma a depressed surface.*

Pollen-glands free or connate, in one pouch.....1. Orchis.
Pollen-glands free, exposed. Flowers purple.....2. Gymnadenia.
Pollen-glands free, exposed. Flowers white or green.....3. Habenaria.

** *Spur very short, stigma of two oblong lobes*.....4. Neotinea.

*** *Spur none.*

Pollen-glands both in one pouch.....5. Aceras.
Pollen-glands exposed.....6. Herminium.
Pollen-glands in two pouches.....7. Ophrys.

TRIBE II. **ARETHUSEÆ.** *Anther* a deciduous 2-celled cap, crowning the column; pollen-masses 2, free or united by their glands, of free grains, hence powdery.....8. Epipogium.

TRIBE III. **NEOTTIDEÆ.** *Anther* a deciduous 2-celled cap hinged to the top or back of the column; pollen-masses 2 or 4, grains waxy or powdery united by an elastic web.

Lateral sepals and petals spreading, tips incurved.

* *Upper lobe of lip concave, lower entire.*

Flowers racemed drooping; ovary straight.....9. Epipactis.
Flowers spiked, suberect; ovary twisted.....10. Cephalanthera.

** *Upper lobe of lip flat, lower 2-lobed*.....11. Listera.
Lateral sepals and petals ascending.
Lip adnate to the base of the column, not saccate.....12 Spiranthes.
Lip free from the base of the column, saccate.....13. Goodyera.

TRIBE IV. **MALAX'IDEÆ.** *Anther* a 2-celled cap, hinged to the back, front, or top of the column; pollen-masses 4, waxy.
Leafy. Lip superior. Column short.....14. Malaxis.
Leafy. Lip inferior or superior. Column slender.....15. Liparis.
Leafless. Lip inferior.....16. Corallorhiza.

TRIBE V. **CYPRI'PEDIEÆ.** *Anthers* 2, lateral.....17. Cypripedium.

1. OR'CHIS, *L.*

Tubers globose ovoid or palmate. *Leaves* chiefly radical, sheathing. *Flowers* spiked. *Sepals* and petals ascending, connivent or the lateral sepals spreading. *Lip* spurred, decurved. *Anther* confluent with the column, cells diverging at the base; pollen-glands in a common pouch; rostellum projecting between the pouches.—DISTRIB. Europe, N. Asia, W. Asia to the W. Himalaya, rare in N. America; species about 70. —ETYM. The old Greek name.

SUB-GEN. 1. **Or'chis** proper. *Lobes* of lip not spirally coiled. *Pollen-glands* not connate.

* *Lateral sepals spreading or reflexed.*

1. **O. mas'cula,** *L.*; tubers ovoid, leaves usually spotted, spike lax, bracts 1-nerved coloured, lip 3-lobed longer than the ovary. *Purple Orchis.*
Copses and pastures; ascending to 1,500 ft. in the Lake district; fl. April–June.—*Stem* 6–18 in. *Leaves* narrow-oblong, obtuse, spots purple-black. *Bracts* equalling the ovary. *Flower* red-purple, rarely white; sepals ¼ in., acute or obtuse; lip as broad as long, margins recurved, spotted with purple, mid-lobe longest, crenate, tip notched; spur stout, obtuse, variable in direction.—DISTRIB. Europe, N. Africa, W. Siberia.—Yields salep.

2. **O. laxiflo'ra,** *Lamk.*; tubers globose, leaves lanceolate, spike lax, bracts 3–5-nerved coloured, lip 2–3-lobed, spur ½ as long as the ovary.
Wet meadows, Jersey and Guernsey; fl. May–June.—*Stem* 1–3 ft., grooved. *Leaves* cauline and radical, acuminate, not spotted. *Bracts* as long as the slender ovary. *Flowers* 1 in. from upper sepal to tip of lip, bright red-purple; sepals and petals obtuse; lip as broad as long, sides reflexed, spotted, lateral lobes very large, crenulate, longer than the middle one, which is sometimes wanting; spur stout, obtuse, variable in direction.—DISTRIB. Europe from Belgium to Portugal and eastwards.

3. **O. latifo'lia,** *L.*; tubers palmate, leaves usually spotted, spike dense, bracts 3-nerved green, lip obscurely 3-lobed, spur usually shorter than the ovary. *O. palmata,* Syme. *Marsh Orchis.*
Moist meadows, &c.; ascending to near 1,600 ft. in Northumberland; fl. June–July.—*Stem* 1–3 ft., usually tubular, leafy upwards. *Leaves* oblong or lanceolate. *Bracts* mostly exceeding the flowers. *Flowers* ¾ in. from upper sepal to tip of lip, dull purple; sepals and petals obtuse or acute; lip spotted with purple, margins recurved, mid-lobe narrowest; spur nearly straight or decurved.—DISTRIB. Europe, N. Africa? N. Asia, Himalaya.

Sub-sp. LATIFO'LIA proper; leaves oblong flat at the tip, flowers smaller darker coloured, lip spotted.

Sub-sp. INCARNA'TA, *L.* (sp.); leaves lanceolate acute unspotted, tip concave, base broader.

4. **O. macula'ta,** *L.*; tubers palmate, leaves spotted, spikes oblong-pyramidal dense, bracts 3-nerved green, lip deeply 3-lobed, spur equalling the ovary or shorter. *Spotted Orchis.*

Moist places, ascending to 3,000 ft. in the Highlands; fl. May–July.—*Stem* 6–18 in., slender, leafy upwards. *Leaves* narrow, oblong-lanceolate, acute or obtuse. *Bracts* subulate, about equalling the ovary. *Flowers* ½ in. from the upper sepal to the tip of the lip, very pale purple, spotted, rarely white; lip as broad as long, margins recurved, mid-lobe narrower and about as long as the lateral, which are toothed; spur straight.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia.

** *Lateral sepals arching and forming a hood with the dorsal and the petals.*

5. **O. Mori'o,** *L.*; tubers globose, spike lax, bracts 1-nerved coloured, lip 3-lobed, spur ascending equalling the ovary. *Green-winged Orchis.*

Meadows, &c. from Northumberland southwards; E. and Mid. Ireland; fl. May–June.—*Stem* 6–12 in. *Leaves* rather small and narrow, unspotted. *Bracts* about equalling the ovary. *Flowers* ⅜ in. from upper sepal to tip of lip, dingy purple; sepals obtuse, veins green; lip spotted, lateral lobes broad crenate, middle about as long; spur nearly straight, obtuse.—DISTRIB. Europe, Siberia, W. Asia.

6. **O. ustula'ta,** *L.*; short, tubers ovoid, spike dense, bracts 1-nerved green, sepals and petals very dark white-spotted, lip 3-lobed, spur ¼ as long as the ovary. *Dark-winged or Dwarf Orchis.*

Dry pastures, from Durham southwards, local; absent from Ireland; fl. May–June.—*Stem* 3–10 in. *Leaves* narrow-oblong, acute, unspotted. *Bracts* variable, scarious. *Flowers* ⅛ in. from sepal to tip of lip, eventually white; sepals and petals dark-purple and green; lip with raised purple spots, lateral and segments of 2-fid mid-lobe nearly equal; spur decurved obtuse.—DISTRIB. Europe from Gothland southwards, W. Siberia.

7. **O. purpu'rea,** *Huds.*; tall stout, tubers ovoid, spike dense, bracts 1-nerved, sepals obtuse green and purple, lip 3-lobed, lateral lobes narrow, mid-lobe obcordate crenulate, segments broad flat crenulate, spur ½ as long as the ovary. *O. militaris,* Sm.; *O. fusca,* Jacq.

Downs and copses in chalk soils, Kent and Surrey; fl. May.—*Stem* 1–3 ft., stout. *Leaves* oblong, 3–5 in., obtuse. *Spikes* usually large, many-flowered. *Flowers* ¾ in. from tip of lip to top of upper sepal; sepals and petals hardly acute, green and purple outside, paler inside, spotted; lip pale rosy, spotted with purple, with a notch in the sinus of the mid-lobe. *Spur* decurved.—DISTRIB. Europe from Holland southwards.

8. **O. milita'ris,** *L.*; tubers ovoid, spike oblong dense, bracts 1-nerved, sepals acuminate and petals pale purple or white, lip 3-lobed, lateral lobes narrow, middle 2-fid with narrow upcurved segments and a tooth in the sinus, spur ½ as long as the ovary.

Woods and chalk downs, Oxford and Berkshire to Sussex and Kent; fl. May–June.—*Stem* 1–1½ ft. *Leaves* large, oblong, obtuse, concave, unspotted. *Bracts* very short. *Flowers* about 1 in. from dorsal sepal to tip of lip, bright

or pale purple; lip pale, dotted with raised rough points, lateral lobes linear, segments of mid-lobe rather broader; spur decurved, obtuse.—DISTRIB. Europe from Gothland southwards, N. Africa? Siberia, Dahuria.

Sub-sp. MILITA'RIS proper; outer sepals pale-purple, lip pale purple, lateral lobes narrow veined, middle deeply 2-fid with lobes rather broader than the lateral.—Berks, Oxford, Bucks.

Sub-sp. SIM'IA, *Lamk.* (sp.); outer sepals white, lip white, lobes crimson narrow, middle deeply 2-fid with lobes as long and narrow as the lateral.—Oxford. *O. tephrosanthos*, Vill.

SUB-GEN. 2. **Anacam'ptis,** *Rich.* (gen.). *Lip* ascending, lobes broad, not spirally coiled; spur very long. *Pollen-glands* connate.

9. **O. pyramida'lis,** *L.*; tubers globose, leaves acuminate, spike pyramidal, bracts 1–3-nerved coloured, lateral sepals spreading, lip 3-lobed 2-tubercled at the base, spur longer than the ovary.

Pastures, &c., from Wigton and Northumberland southwards; Mid. Ireland; fl. June–Aug.—*Stem* 6–24 in., slender. *Leaves* chiefly radical, lanceolate. *Spike* pyramidal, then oblong. *Bracts* as long as the ovary. *Flowers* rosy rarely white; sepals and petals obtuse; lip broader than long, lobes subentire, variable in shape and relative size.—DISTRIB. Europe from the Baltic southwards, N. Africa.—Scent of flowers peculiar,

SUB-GEN. 3. **Himantoglos'sum,** *Rich.* (gen.). *Lobes of lip* very long, spirally coiled in bud; spur very short. *Pollen-glands* connate.

10. **O. hirci'na,** *L.*; tubers ovoid, stem tall, spike long, bracts very long ribbed green, lateral sepals conniving, mid-lobe of lip strap-shaped, spur much shorter than the ovary. *Lizard Orchis.*

Copses in Suffolk and Kent, extremely rare; fl. July–Aug.—*Stem* 1–3 ft. *Leaves* chiefly radical, oblong, obtuse. *Spike* 6–17 in. *Bracts* 1–2 in., much exceeding the flowers. *Flowers* large; sepals and petals forming a green hood ½ in. long; lip 1½ in., white, purple-spotted at the base, lateral lobes slender, mid-lobe about 1 in. by ½ broad, green.—DISTRIB. Europe from Belgium southwards, N. Africa.—Scent detestable, hircine.

2. GYMNADE'NIA, *Br.*

Characters of *Orchis*, but the free glands of the pollen-masses contiguous, exposed, not contained in pouches.—DISTRIB. Mountain districts of Europe; species about 25.—ETYM. *γυμνός, naked,* and *ἀδήν, gland.*

1. **G. Conop'sea,** *Br.*; tubers palmate, flowers purple, lateral sepals spreading, lip obtusely 3-lobed, spur slender. *Fragrant Orchis.*

Dry pastures; ascending to 2,000 ft. in the Highlands; fl. June–Aug.—*Stem* 6–18 in. *Leaves* oblong-lanceolate, keeled, acute. *Spikes* dense- or lax, narrow. *Bract* as long as the ovary, green, 3-nerved. *Flowers* bright rose-red or purple, broader than long, ⅓ in. diam.; sepals and petals obtuse; lip broad, lobes 3, subequal, rounded entire; spur very slender, flexuous.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia.—Very fragrant.

3. HABENAR'IA, *Br.*

Tubers 2, if more narrow and fascicled. Habit of *Orchis*, but glands of pollen-masses free, distant, exposed.—DISTRIB. Temp. and subtrop. regions of the N. hemisphere; species nearly 100.—ETYM. Doubtful.

1. **H. bifo'lia,** *Br.*; leaves 2, flowers whitish, sepals spreading, lip linear-oblong entire, spur twice as long as the ovary. *Butterfly Orchis.*

Wet meadows, heaths; ascending to 1,500 ft. in the N. of England; fl. June–Aug.—*Tubers* 2, ovoid. *Stem* 6–18 in. *Leaves* rarely 3, lower 3–6 in., ovate or oblong, obtuse, narrowed at the base, upper small, lanceolate. *Spikes* 4–6 in., lax-flowered; bracts equalling or exceeding the ovary, green. *Flowers* 1 in. from upper sepal to tip of lip, tinged with green or yellow; sepals subacute, dorsal broad, lateral large; petals small; lip obtuse. *Column* without a rostellum.—DISTRIB. Europe, N. Asia (Arctic).—Very fragrant. The following sub-species are, according to Darwin, very distinct, and require different species of moth to fertilize them. They vary in the position and distances of their anther-cells, and intermediates occur.

Sub-sp. BIFO'LIA proper; lateral sepals narrow, spur slender spreading, anther-cells parallel, caudicle short, glands oblong; fl. June–July.

Sub-sp. CHLORAN'THA, *Bab.* (sp.); flowers usually larger greener, lateral sepals broader, spur stout decurved more clavate, anther-cells more distant diverging, caudicles longer, glands orbicular; fl. July–Aug.

2. **H. vir'idis,** *Br.*; leaves several, flowers green, sepals conniving, lip linear-oblong 2-fid, spur very short. *Frog Orchis.*

Hilly meadows, especially northwards, local; ascending to 2,500 ft. in the Highlands; fl. June–Aug.—Tubers ovoid, often lobed. *Stem* 3–12 in. *Leaves* narrow-oblong, obtuse, smaller upwards. *Spike* lax; bracts green exceeding the ovaries. *Flowers* ⅛–¼ in.; hood hemispheric, petals and sepals striped with dark red; lip paler, browner. *Anther-cells* diverging, rostellum 0.—DISTRIB. Europe (Arctic), Siberia, Dahuria, N. America.

3. **H. al'bida,** *Br.*; tubers fascicled, flowers white, lateral sepals conniving, lip acutely 3-lobed, spur very short. *Gymnadenia,* Rich.

Hilly pastures, from Sussex and Cardigan northwards; ascending to near 1,900 ft. in the Highlands; W. and N. of Ireland; fl. June–Aug.—*Stem* 6–12 in. *Leaves* small, obtuse, upper acute. *Spike* narrow, dense; bracts green, equalling the ovary. *Flowers* ⅛ in., subsecund; ovary short; sepals and petals obtuse; lip small, projecting; lobes triangular.—DISTRIB. Europe except Turkey, W. Siberia, Greenland.—Sweet-scented.

4. NEOTI'NEA, *Reich. fil.*

An inconspicuous herb. *Tubers* ovoid. *Flowers* small. *Lateral sepals* and *petals* forming a hood. *Lip* 3-lobed; spur minute. *Anther-cells* parallel; pollen-masses 4, glands free, naked, concealed behind the broad recurved rostellum. *Stigmas* 2, diverging, linear-oblong or reniform.—DISTRIB. France, S. Europe, N. Africa, Asia Minor.—ETYM. Originally *Tinea,* with *neo* added to distinguish it from the genus of moths.

1. **N. intac'ta,** *Reich. fil.*; leaves oblong often spotted. *Tinea,* Bivoni.

Limestone pastures, Galway; fl. June.—Habit of *Gymnadenia albida,* but smaller, 4–10 in. *Spike* dense-flowered, sometimes twisted; bracts shorter than the ovary, 1-nerved. *Flowers* ⅛ in., pink or purplish; sepals darker; petals acute; lip projecting, lateral lobes short linear, middle entire or lobed.—I copy Reichenbach's description of the column, anthers, &c.

5. AC'ERAS, *Br.* MAN ORCHIS.

Tubers ovoid. *Sepals* and *petals* connivent and forming a hood. *Lip* elongate, 4-lobed; spur 0. *Anther* confluent with the column; cells

parallel; pollen-masses 2, glands connate in one pouch. *Stigma* depressed; rostellum obsolete.—DISTRIB. Europe, N. Asia, and Himalaya; species 3–4.—ETYM. *ἀ, privative,* and *κέρας, spur.*

1. **A. anthropoph'ora,** *Br.*; perianth green, lobes of lip linear.

Pastures and copses in chalky soil in S.E. of England, from Lincoln to Kent and Sussex, scarce; fl. June–July.—*Stem* 8–16 in. *Leaves* oblong-lanceolate, lower obtuse, upper acute. *Spike* lax-flowered, narrow; bracts small. *Flower* ½–¾ in.; sepals and petals often edged with red; lip perpendicular, yellow, edges red, narrow, with 2 lateral and 2 terminal lobes, all similar and linear.—DISTRIB. Europe from Belgium southwards, N. Africa.

6. HERMIN'IUM, *Br.* MUSK ORCHIS.

Tubers ovoid. *Leaves* 2 or few. *Perianth-segments* incurved. *Lip* 3-lobed; spur 0. *Column* with short lateral arms. *Anther* confluent with the column, cells diverging below; pollen-masses 2, subsessile, glands large, exposed. *Stigma* discoid; rostellum 0.—DISTRIB. Europe, temp. Asia; species 4.—ETYM. *ἑρμίν, the foot of a bed-post,* from the shape of the tubers.

1. **H. Monor'chis,** *Br.*; flowers minute, subsecund, green.

Chalky downs, S.E. of England, from Norfolk, Cambridge, and Gloucester, to Dorset and Kent; fl. June–July.—*Tubers* at the end of fleshy fibres. *Stem* 4–10 in., slender. *Leaves,* radical 2, narrow-oblong, acute; cauline solitary. *Spike* slender, rather lax; bract green, as long as the ovary. *Flowers* ⅛ in.; sepals broad; petals narrower, longer, obscurely lobed at the side; lip narrow, 3-lobed, base saccate, mid-lobe entire narrow.—DISTRIB. Europe (Arctic) except Spain, Siberia, Himalaya.—Odour of musk.

7. O'PHRYS, *L.*

Tubers ovoid. *Perianth* spreading. *Petals* small. *Lip* perpendicular, usually convex, velvety; spur 0. *Anther* capping the column, arched forwards, often beaked, cells parallel; pollen-masses 2, glands in separate pouches. *Stigma* a depressed disk; rostellum 0. *Ovary* not twisted.—DISTRIB. Europe, N. Africa, W. Asia; species about 30.—ETYM. *ὀφρύς,* an *eyebrow,* from the markings of the lip.

1. **O. apif'era,** *Huds.*; sepals pink or white inside, lip broad convex 3-lobed, with a terminal appendage, anther-beak hooked. *Bee Orchis.*

Copses and fields in chalk and limestone districts, from Durham and Lancaster to Sussex and Kent; ascending to 1,000 ft. in W. of England; S. and Mid. Ireland on limestone and sandhills; fl. June–July.—*Stem* 6–18 in. *Leaves* short, oblong. *Spike* 3–6-flowered; bracts large, leafy. *Flowers* 1–1¼ in.; sepals ovate; petals small, downy, linear-oblong, obtuse; lip brown-purple, lateral lobes tubercled at the base, disk spotted with orange yellow.—DISTRIB. Europe from Belgium southwards, N. Africa.

Sub-sp. APIF'ERA proper; petals linear, lip equalling the sepals deeply 3-lobed, appendage recurved.

Sub-sp. ARACH'NITES, *Willd.* (sp.); petals subdeltoid-ovate, lip longer than the sepals, appendage straight or incurved.—Chalk downs, Folkestone.

2. **O. aranif'era,** *Huds.*; sepals yellow-green inside, petals oblong, lip broad convex without an appendage, anther beaked. *Spider Orchis.*

Copses and downs in chalk and limestone, from Northampton and Suffolk to

Dorset and Kent; fl. April–May.—Habit of *O. apifera*. *Lip* brown with various glabrous markings.—DISTRIB. Europe from France southwards.

VAR. 1, *aranif'era* proper; petals almost glabrous, lip usually lobed at the margin.—VAR. 2, *fucif'era*, Smith (sp.); petals downy within, lip rarely lobed, its tubercles less prominent.

3. **O. muscif'era**, *Huds.*; sepals yellow-green, petals narrow linear, lip longer than broad narrow nearly flat, anther not beaked. *Fly Orchis.*

Copses and downs on chalk and limestone, from Durham and Westmoreland southwards; Mid. Ireland, very rare; fl. May–July.—*Stem* slender, 10–18 in. *Leaves* few, linear-oblong. *Flowers* distant, ¾ in.; petals and lip bright red-brown; lip with a blue patch, sometimes edged with yellow, lateral lobes reflexed, terminal 2-fid.—DISTRIB. Europe from Norway southwards.

8. EPIPO'GIUM, *Gmelin.*

A leafless root-parasite. *Rootstock* of fleshy branched fibres. *Flowers* racemed. *Sepals* and *petals* rather spreading. *Lip* superior, ovate, 3-lobed, disk with rows of glands; spur short, stout. *Anther* terminal, deciduous; pollen-masses 2, in cavities of the cylindric column, stalked, glands connate. *Stigma* prominent, horseshoe-like; rostellum 0. *Ovary* not twisted. —DISTRIB. Europe N. of the Alps, N. Asia, Himalaya.—ETYM. ἐπί and πώγων, from the *lip* being uppermost.

1. **E. Gmeli'ni**, *Rich.*; flowers pale yellow. *E. aphyllum*, Sw.

Amongst decayed leaves, Tedstone in Delamere Forest, Hereford, only once found; fl. Aug.—*Stem* 4–8 in., tumid above the base, pale yellow-brown, with 1 or 2 appressed sheaths. *Bracts* as long as the pedicels. *Flowers* 2–6, shortly pedicelled, 1 in.; ovary broad, short; sepals and petals narrow-lanceolate, subequal, margins involute; lip recurved, lateral lobes small, middle whitish with red glands; spur obtuse.

9. EPIPACTIS, *Rich.* HELLEBORINE.

Rootstock creeping. *Stem* leafy. *Flowers* racemed, ovary straight, pedicel twisted. *Sepals* and *petals* conniving or spreading. *Lip* much contracted in the middle, basal lobe concave, terminal entire with 2 basal tubercles. *Anther* sessile, hinged on the top of the column; pollen-masses 2, powdery, glands connate. *Stigma* prominent; rostellum short, erect. *Capsule* pendulous.—DISTRIB. Europe, N. Asia, Himalaya; species 8.—ETYM. The classical name for this or another plant.

1. **E. latifo'lia**, *Sw.*; leaves rotundate ovate or oblong, bracts mostly exceeding the flowers, upper lobe of lip with rounded margins, lower broadly ovate acute or apiculate rarely entire, ovary broadly pyriform.

Woods; fl. July–Aug.—*Stem* 1–3 ft., pubescent above. *Leaves* variable, ribbed. *Raceme* many-flowered, bracts green. *Flowers* subsecund, ½–⅔ in. diam., green, variously marked with yellow-white or purple; sepals broadly ovate; petals ovate-lanceolate; lip variable in form and colour, as long as the sepals or shorter, lower lobe with thickened ridges on the disk.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Himalaya.—*I* am indebted to Mr. Britten for the synonymy of the following sub-species.

Sub-sp. LATIFO'LIA proper (sp.); leaves broadly oblong, raceme lax, flowers greenish-yellow spotted brown inside, sepals ovate-lanceolate spreading as long as the ovary, lower lobe of lip subdeltoid, ridges plaited and rugose.

E. viridiflora, Hoffm.; *E. purpurata*, Sm.; *E. Helleborine*, var. *varians*, Crantz; *E. media*, Bab.—Flowers earlier than *viridans*.

Sub-sp. VIR'IDANS; leaves broadly ovate, racemes dense, flowers greenish-white rosy inside, sepals incurved shorter than the ovary, lower lobe of lip sub-orbicular, ridges smooth. *E. Helleborine*, var. *viridans*, Crantz.

Sub-sp. RUBIGINO'SA, *Koch* (sp.); leaves ovate-lanceolate, raceme lax, flowers small dingy red-purple, sepals incurved shorter than the ovary, lower lobe of lip broader than long, ridges plaited and rugose. *E. ovalis*, Bab.; *E. media*, Fries; *E. Helleborine*, var. *rubiginosa*, Crantz.—Limestone, local, from Hereford northwards, and in Ireland; ascends to 1,200 ft. in Yorkshire.

2. **E. palus'tris,** *L.*; leaves lanceolate, bracts mostly short, upper lobe of lip angular lower obtuse crenate, ovary very narrow-pyriform.

Marshy places, from Fife southwards to Devon and Kent; rare in Scotland and Ireland; fl. July.—*Stem* 8–18 in., slender, wiry, pubescent above. *Leaves* acute, upper acuminate. *Flowers* few, ½–¾ in. broad; sepals and petals ovate, subacute, green striped with purple; lip white, streaked with red, lower lobe tubercled towards the base.—DISTRIB. Europe, Siberia.

10. CEPHALAN'THERA, *Richard.*

Rootstock creeping. *Stems* leafy. *Leaves* subdistichous. *Spikes* few-flowered; ovary twisted. *Flowers* suberect, sepals and petals incurved. *Lip* decurved, constricted in the middle, upper lobe saccate, lower not tubercled, crested on the disk. *Anther* hinged on the contracted top of the column; pollen-masses 2, powdery, glands connate. *Stigma* prominent; rostellum 0. *Capsule* erect.—DISTRIB. Europe, N. Asia, Himalaya; species 4.—ETYM. κεφαλή and ἄνθηρ, from the position of the *anther*.

1. **C. grandiflo'ra,** *Bab.*; leaves ovate-oblong, lower bracts large much exceeding the almost glabrous ovary, flowers white. *White Helleborine.*

Woods and copses chiefly in chalky districts, from Cumberland to Dorset and Kent, rare; absent from Ireland; fl. May–June.—*Stems* tufted, 1–2 ft. *Leaves* 3–6 in., upper narrower. *Flowers* ¾ in., distant, suberect, cream-white; sepals and petals ovate-oblong, obtuse; lower lobe of lip orbicular, erect, yellow.—DISTRIB. Europe from Denmark southwards.

2. **C. ensifo'lia,** *Rich.*; leaves ovate or lanceolate, bracts of upper flowers much smaller than the almost glabrous ovaries, flowers white.

Woods and copses from Skye and Perth to Hants and Kent, local; rare in Ireland; fl. May–June.—*Stems* 1–2 ft., subsolitary, slender. *Upper bracts* minute. *Leaves* usually longer than in *C. grandiflora*, flowers whiter and narrower, sepals more acute.—DISTRIB. Europe, W. Siberia, W. Asia.

3. **C. ru'bra,** *Rich.*; leaves lanceolate, bracts exceeding the glandular pubescent ovaries, flowers rose-purple. *Red Helleborine.*

Woods and copses in chalky districts, Gloucester and Somerset, very rare; fl. June–July.—*Stem* 6–18 in., slender. *Flowers* few or many; sepals and petals acuminate; lip white, lower lobe ovate-lanceolate. *Column* slender. —DISTRIB. Europe from Gothland southwards, W. Siberia.

11. LISTE'RA, *Br.*

Root of fleshy fibres. *Leaves* 2, subopposite, or 0. *Flowers* racemed, green or brown. *Sepals* and *petals* spreading and incurved. *Lip* deflexed,

2-fid; spur 0. *Anther* hinged on to the back of the column, 2-celled; pollen-masses 2, powdery, glands connate. *Stigma* prominent; rostellum tongue-shaped.—DISTRIB. N. temp. and cold regions; species 6.—ETYM. *Dr. Martin Lister*, a British naturalist.

SUB-GEN. 1. **Liste'ra** proper.—*Stem* 2- rarely 3-leaved. *Lip* linear, with 2 straight nearly parallel terminal lobes.

1. **L. ova'ta,** *L.*; stem tall terete pubescent above, leaves broadly elliptic, lip 2-fid without lateral lobes. *Tway-blade.*

Woods and pastures, ascending to near 1,900 ft. in N. of England; fl. May–July.—*Stem* 1–2 ft., solitary, stout. *Leaves* 3–8 in., ribbed. *Raceme* elongate; bracts minute. *Flowers* ½ in.; sepals deep green, ovate, subacute; petals yellow-green; lip the same, slightly saccate at the base, apiculate between the terminal lobes.—DISTRIB. Europe (Arctic), Siberia.

2. **L. corda'ta,** *Br.*; small, glabrous, stem angled fragile, leaves ovate-cordate, lip 2-fid and with 2 basal linear lobes. *Lesser Tway-blade.*

Mountain woods and moors, especially under heather, from Hampshire and N. Devon northwards, ascending to 2,700 ft. in the Highlands; rare in Ireland; fl. July–Sept.—*Stem* 4–8 in., brownish-green. *Leaves* ½–1 in., sessile, membranous, acute. *Raceme* lax, few-flowered; bracts minute. *Flowers* ⅛ in.; sepals and petals olive-brown, obtuse; lip dirty yellow-green, terminal lobes linear.—DISTRIB. Arctic and Alpine Europe, N. Asia, N. America.

SUB-GEN. 2. **Neot'tia,** *L.* (gen.). A brown leafless root-parasite. *Stem* with sheathing scales. *Lip* concave at the base, terminal lobes divaricate.

3. **L. Nidus-a'vis,** *L.*; raceme lax-flowered. *Bird's-nest Orchis.*

Dark woods, especially beech, from Forfar and Argyle southwards; E. and N.E. only of Ireland; fl. June–July.—*Root* a mass of succulent, stout, interlaced fibres. *Stem* robust, 1–1½ ft., dirty-brown. *Flowers* ½ in., grey-brown, bracts short.—DISTRIB. Europe, W. Siberia.

12. SPIRAN'THES, *Rich.* LADY'S-TRESSES.

Root of tubers or stout fibres. *Stem* leafy. *Spike* of small flowers in 1–3 spirally-twisted rows. *Sepals* and *petals* similar, suberect; sepals gibbous at the base; upper adnate to the petals, forming a tube round the lip. *Lip* embracing and adnate to the base of the column, tip entire, disk 2-tubercled. *Anther* hinged on to the back of the column, 2-celled; pollen-masses 4, powdery, sessile on one linear gland. *Stigma* discoid; rostellum beaked, finally 2-fid.—DISTRIB. trop. and temp. regions; species 46.—ETYM. σπεῖρα and ἄνθος, from the *twisted inflorescence.*

1. **S. autumna'lis,** *Rich.*; tubers 2–3 ovoid, flowering-stem sheathed distinct from the root-leaves, spike slender, flowers many in 1 series.

Dry pastures from Westmoreland and York southwards; S. and Mid. Ireland; fl. Aug.–Sept.—*Stem* 4–8 in., slender, upper part and inflorescence pubescent. *Leaves* 1 in., in lateral rosettes, ovate, acute, appearing after the flowers. *Flowers* sheathed by the cucullate cuspidate bracts. *Perianth* ⅛ in., white; lip channelled at the base, tip exserted, crenate.—DISTRIB. Europe from Denmark southwards, N. Africa.—Flowers fragrant.

2. **S. æstiva'lis,** *Rich.*; tubers several cylindric, radical leaves on the flowering stem linear, spike slender many-flowered, flowers in 1 series.

Bogs; New Forest, Wyre Forest Worcester, Jersey and Guernsey; fl. July–Aug.—*Stem* 6-18 in., glabrous. *Leaves* 2-6 in., narrowed below. *Spike* slightly pubescent. *Flowers* and bracts as in *S. autumnalis*, but rather larger.—DISTRIB. W. Europe from Belgium southwards, N. Africa.

3. **S. Romanzov'iana,** *Cham.*; tubers several cylindric, radical leaves on the flowering stem narrow obovate-lanceolate, spike stout, flowers in 3 series. *S. cernua*, Hook. not Rich.; *S. gemmipara*, Lindl.

Meadows, Bantry Bay, Co. Cork; fl. Aug.–Sept.—*Stem* 6-10 in., stout, glabrous, leafy throughout. *Leaves*, lowest 3-6 in. *Spike* 2-3 in., glandular-pubescent; bracts sheathing the base of the ovary, subulate-lanceolate. *Flowers* white, much larger and broader than in the preceding species; lip tongue-shaped, contracted below the crenate recurved tip, tubercles at the base smooth and shining.—DISTRIB. N. America, New York to the Pacific.—Gray correctly refers *S. gemmipara* to *Romanzoviana*. *S. cernua*, to which I once referred this, is also common in the U. States, and had till quite lately been confounded with it by American botanists.

13. GOODYE'RA, *Br.*

Rootstock creeping. *Leaves* usually ovate and petioled. *Flowers* small, spiked, in spiral series. *Upper sepal* and *petals* ascending, free or connate; lateral sepals deflexed, embracing the base of the lip. *Lip* decurved, entire, base saccate. *Anther* hinged on to the back of the column, 2-celled; pollen-masses of loosely cohering grains, sessile on one oblong gland. *Stigma* discoid; rostellum beaked, finally 2-fid.—DISTRIB. N. temp. regions; species 16.—ETYM. *John Goodyer*, an English botanist.

1. **G. re'pens,** *Br.*; leaves ovate acute, nerves reticulate.

Fir woods in E. Scotland, from Berwick and Roxburgh to Ross, local and rare; fl. July–Aug. — *Rootstock* slender, matted, widely creeping. *Stem* 4-8 in., slender, and inflorescence glandular-pubescent. *Leaves* ½–1 in., acute, dark green, pubescent beneath. *Spike* slender; bracts subulate-lanceolate, longer than the ovary. *Flowers* cream-white; perianth ¼ in.—DISTRIB. Mid. and N. Europe (Arctic), Siberia, Himalaya, N. America.

14. MALAX'IS, *L.*

A small green subsucculent herb. *Leaves* few, broad, short. *Flowers* minute, racemose, green. *Sepals* and very small *petals* spreading. *Lip* superior, minute, entire, concave. *Anther* hinged on to the top of the minute column, persistent; pollen-masses 4, waxy, attached to one gland. *Stigma* depressed; rostellum minute.—DISTRIB. Europe (Arctic) N. of the Alps, Siberia, Dahuria.—ETYM. *μάλαξις*, in allusion to its softness.

1. **M. paludo'sa,** *Sw.*; leaves obovate obtuse. *Bog Orchis.*

Sphagnum swamps and bogs, from Dorset and Sussex northwards, scarce and easily overlooked; ascending to 1,500 ft. in the N. of England; rare and local in Ireland; fl. July–Sept.—*Stem* 1-4 in., swollen and sheathed with white scales at the base, forming a new plant at the side of the old, angled above. *Leaves* few, fringed with cellular bulbils that develop new plants. *Raceme* elongate, many-flowered; bracts minute; pedicel twisted. *Flowers* ⅛ in., yellow-green; sepals ovate; petals linear-oblong, recurved; lip about equalling the petals, erect, acute, embracing the column at its base.

15. LI'PARIS, *Rich.*

Habit of *Malaxis*, but usually 2-leaved. *Sepals* and *petals* spreading, linear. *Lip* inferior or superior, broader than the sepals, entire. *Anther* terminal on the slender column, deciduous, pollen-masses 4, waxy, glands evanescent. *Stigma* small, depressed; rostellum minute.—DISTRIB. Temp. and trop. regions; species 33.—ETYM. Λιπαρός, from its *greasy* texture.

1. **L. Loese'lii,** *Rich.*; leaves elliptic-lanceolate acute keeled petioled, lip oblong-obovate mucronate. *Sturmia*, Reich. *Fen Orchis.*

Spongy bogs in Norfolk, Suffolk, Huntingdon, and Cambridge; fl. July.—*Stem* 4–8 in., swollen and sheathed with white scales at the base, 3-gonous and leafless above. *Leaves* 1–3 in. *Flowers* few, ½ in., ascending, pale yellow-green; bracts mostly small.—DISTRIB. Europe N. of the Alps.

16. CORALLORHI'ZA, *Haller.* CORAL-ROOT.

Leafless. *Root* of branched, fleshy, interlaced fibres. *Stem* with sheathing scales. *Flowers* few, small, subracemose. *Upper sepal* and *petals* connivent, lateral sepals spreading. *Lip* deflexed, short, lateral lobes small; spur minute, adnate to the ovary. *Anther* terminal on the short column, deciduous, 2-celled; pollen-masses 4, subglobose, granular, free. *Stigma* discoid; rostellum inconspicuous.—DISTRIB. N. temp. regions; species 10.—ETYM. κοράλλιον and ῥίζα, *coral root.*

1. **C. inna'ta,** *Br.*; sepals linear-lanceolate, lip oblong.

Boggy or sandy woods and copses in Scotland, from Moray and Ross to Ayr and Berwick, rare; fl. July–Aug.—*Stem* 6–10 in., slender; sheaths lax, red-brown. *Raceme* 4–8-flowered, pedicels very short; bracts minute. *Flowers* horizontal; perianth ¼ in.; sepals ovate-lanceolate, olive-green, lateral deflexed and petals narrower; lip whitish with small purple tubercles.—DISTRIB. Arctic, N. and Mid. Europe, Siberia, Dahuria, N. America.

17. CYPRIPE'DIUM, *L.* LADY'S SLIPPER.

Rootstock creeping. *Stem* leafy or leafless. *Sepals* and *petals* spreading. *Lip* large, inflated. *Column* curved over and nearly closing the small orifice of the lip, bearing a terminal dilated lobe (deformed stamen), on each side of the base of which is a short antheriferous arm, and below it a discoid pedicelled stigma. *Anthers* 2, partially 2-celled; pollen viscid, granular; rostellum 0. *Ovary* straight.—DISTRIB. Trop. and temp. regions; species 50.—ETYM. Κύπρις and πόδιον, *Venus' slipper.*

1. **C. Calce'olus,** *L.*; bracts foliaceous, lip obovoid.

Woods in limestone districts, Westmorland, Durham and York, nearly extinct; fl. May.—Pubescent. *Stem* 6–18 in. *Leaves* oblong, acuminate, ribbed. *Flowers* 1–2; bracts foliaceous; sepals red-brown, upper 1–1½ in., erect, ovate-lanceolate, acuminate; lateral narrower, usually connate, and placed under the lip; petals 1½ in., linear; lip as long, pale yellow, obovoid, with a rounded upturned end.—DISTRIB. Europe (Arctic), excl. Spain Peninsular Italy and Turkey, N. Asia, Himalaya.

ORDER III. I'RIDEÆ.

Perennial herbs; rootstock tuberous, bulbous, or creeping, or a corm. *Leaves* often equitant and ensiform. *Flowers* regular or not, enclosed in 2 spathaceous bracts. *Perianth* superior, petaloid, of 6 imbricate segments in 2 series, often twisted and persistent after flowering. *Stamens* 3, epigynous or inserted on the outer perianth-segments; anthers usually narrow, bursting outwards. *Ovary* 3-celled; style simple, stigmas 3 often dilated simple or divided; ovules very many, anatropous, in the inner angles of the cells. *Capsule* 3-gonous, 3-celled, loculicidally 3-valved. *Seeds* many, testa coriaceous or thin, raphe separable, albumen horny or fleshy; embryo terete, short, cylindric.—DISTRIB. Chiefly extra-tropical; genera about 50, and species 500.—AFFINITIES. With *Amaryllideæ* and *Orchideæ*.—PROPERTIES. Purgative and diuretic.

Segments of perianth nearly equal.
- Perianth-tube short. Stigmas 3, 2-partite.....1. Trichonema.
- Perianth-tube short. Stigmas 3, entire.....1*. *Sisyrinchium.*
- Perianth-tube long. Stigmas 3, cleft.....2. Crocus.

Segments of perianth unequal.
- Perianth regular.....3. Iris.
- Perianth irregular and oblique.....4. Gladiolus.

1. TRICHONE'MA, *Ker.*

Corm sheathed. *Leaves* radical, slender, linear. *Scape* simple or branched. *Perianth* regular; tube very short; segments equal, suberect, tips recurved. *Stamens* on the throat of the perianth, filaments free, hairy; anthers basifixed. *Ovary* short, 3-gonous; stigmas linear 2-cleft. *Capsule* ovoid, 3-lobed. *Seeds* subglobose, testa coriaceous.—DISTRIB. Chiefly S. Africa; species 21.—ETYM. θρίχ and νῆμα, from the *hairy filaments.*

1. **T. Colum'næ,** *Rich.*; leaves wiry. *T. Bulbocodium,* Sm. not L.

Sandy pastures, Dawlish, Jersey, Guernsey; fl. March–May.—*Corm* size of a pea, ovoid; sheaths brown, shining. *Leaves* 2–4 in., recurved, subcylindric, grooved above. *Scape* very short, 1–3-flowered; spathe longer than the perianth-tube; pedicels curved in fruit. *Perianth-segments* ½–¾ in., subacute, greenish outside, whitish inside with purple veins and yellow base. *Capsule* small.—DISTRIB. W. Europe from France southwards, Mediterranean shores.

1*. *SISYRIN'CHIUM, L.* BLUE-EYED GRASS.

Root of rigid fibres. *Leaves* radical, linear, equitant. *Scape* usually 2-edged. *Flowers* umbellate. *Perianth* regular, tube very short; segments equal, spreading or suberect. *Stamens* on the throat of the perianth, free or connate at the base; anthers basifixed. *Ovary* short, 3-gonous; style short, stigmas 3 filiform involute. *Capsule* subglobose, coriaceous. *Seeds* subglobose or angled, testa hard.—DISTRIB. N. and S. America; species 42.—ETYM. Obscure.

S. BERMUDIA'NUM, *L.*; bracts subequal. *S. anceps,* Bab. not Lamk.

Bogs, Woodford in Galway; fl. July–Aug.—*Leaves* 3–5 in., ⅛ in. broad, ensiform. *Scape* 6–18 in., flattened, wing narrow. *Bracts* shorter than the 1–4 flowers, which are ¾ in. diam. *Perianth-segments* blue inside, obcordate, retuse, mucronate.—DISTRIB. Arctic and temp. N. America, Bermudas.

2. CRO'CUS, *L.*

Corm with sheathing fibrous coats. *Stem* 0. *Leaves* radical, surrounded by scarious sheaths, narrow-linear, channelled, white beneath, margins recurved. *Flowers* solitary or fascicled, almost sessile. *Perianth* large, tube very long; segments equal, narrow-oblong, concave. *Stamens* on the bases of the outer segments, filaments free; anthers basifixed. *Ovary* subterranean, hidden amongst the leaf-bases, ovoid, colourless; style filiform, stigmas 3 cuneate dilated or laciniate. *Capsule* on a long thin pedicel, fusiform. *Seeds* globose, testa thick.—DISTRIB. Europe, N. Africa, N. and W. Asia; species 28.—ETYM. The old Greek name.

1. **C. nudiflo'rus,** *L.*; flowers solitary autumnal, stigmas multifid.

Meadows, Lancaster, Derby, Notts, Warwick, Stafford, &c.; a denizen or native, *Watson*; fl. Sept.-Oct.—*Corm* subglobose, clothed with rich brown coats of parallel fibres. *Leaves* vernal. *Perianth lobes* 2 in., bright purple. *Anthers* pale orange-yellow. *Stigmas* orange, their segments truncate and crenate. *Seeds* as in *C. vernus*.—DISTRIB. France and Spain.

C. VER'NUS, *L.*; flowers few vernal, stigmas toothed. *Purple Crocus.*

Naturalized in meadows at Nottingham, Hornsey, Middlesex, and elsewhere in England and Ireland; fl. March-April.—*Corm* broad, depressed; sheaths of reticulate fibres, much torn, dirty brown. *Perianth lobes* 1-2 in., purple or white. *Anthers* pale bright-yellow. *Stigmas* deep-orange. *Capsule* ½-¾ in. *Seeds* reddish, small.—DISTRIB. Mid. and S. Europe.

3. I'RIS, *L.*

Rootstock tuberous or creeping. *Leaves* chiefly radical, equitant, ensiform. *Scape* compressed; spathes terminal with scarious borders. *Perianth-tube* short, rarely long; sepals large, stipitate, reflexed, stipes channelled; petals smaller, suberect, stipitate, margins of stipes involute. *Stamens* inserted on the base of the sepals, filaments free; anthers basifixed. *Ovary* 3-gonous; style stout, stigmas 3 very broad petaloid arching over the stamens 2-fid and with a transverse lamella, stigmatic surface a point below the lamella. *Capsule* coriaceous, 3-gonous, 3-ribbed. *Seeds* many, flat or globose, testa coriaceous hard or thick.—DISTRIB. N. temp. regions; species 48.—ETYM. The Greek name, from the hues of the flower.

1. **I. Pseud-ac'orus,** *L.*; flowers bright yellow, petals ¾ shorter than the sepals. *Yellow Flag.*

River-banks, ditches, &c.; fl. May-Aug.—*Rootstock* creeping, stout. *Leaves* 2-4 ft., ½-1 in. broad. *Scape* 2-4 ft., leafy, often branched at the top; pedicels about as long as the ovary; spathes 2 in., acute or obtuse. *Flowers* 3-4 in. diam., tube cylindric, variable in colour and form of the segments; sepals often purple-veined, with an orange spot near the base; petals spathulate. *Stigmas* yellow. *Seeds* much vertically compressed, faces flat, testa hard.—DISTRIB. Europe, N. Africa, Siberia.—Rootstock acrid.

2. **I. fœtidis'sima,** *L.*; flowers yellow or purple, petals ¼ shorter than the sepals. *Fœtid Iris, Roast-beef plant.*

Copses and hedgebanks, chiefly on limestone and chalk, from Durham southwards; naturalized only in Scotland; rare in Ireland; fl. May-July.—*Rootstock* stout, creeping. *Leaves* much as in *I. Pseud-acorus*, darker green and more flaccid. *Scape* 1-2 ft., leafy; pedicels longer than the ovary; spathes 3-4 in.,

acuminate. *Flowers* 3 in. diam.; sepals obovate-lanceolate, blue-purple, rarely yellow; petals and stigmas spathulate, yellow. *Capsule* 2–3 in., clavate. *Seeds* globose, testa fleshy orange-red.—DISTRIB. France, Spain, Austria, Italy, Turkey, N. Africa.

4. GLADI'OLUS, *L.*

Corms with reticulate fibrous coats. *Leaves* equitant, ensiform. *Scape* tall. *Flowers* usually secund, showy, spiked, inclined or horizontal. *Perianth* irregular, sub-2-labiate; tube short, curved, segments obovate. *Stamens* ascending, on the perianth tube; anthers linear, versatile. *Ovary* ovoid; style filiform, stigmas 3 broad undivided. *Capsule* coriaceous. *Seeds* compressed, winged, or globose with a fleshy testa.—DISTRIB. Europe, W. Asia, chiefly S. African.—ETYM. *gladiolus*, a *little sword.*

1. **G. commu'nis,** *L.*; var. *illyricus*, Koch (sp.); leaves glaucous, spathes subequal, perianth campanulate. *G. imbricatus*, Bab. not Reich.

Open grounds, New Forest and I. of Wight, rare; fl. June–July.—*Corm* size of a hazel-nut, with many bulbils at its base. *Leaves* 6–10 in., ⅓–½ in. diam., glaucous, acuminate. *Scape* 2–3 ft., leafy. *Spike* 4–8-flowered; spathes subequal, lanceolate, acuminate. *Perianth* 1–1½ in., curved, crimson-purple; 3 upper segments spathulate; 3 lower more obovate, paler with strong red-purple veins. *Stigmas* spathulate, margins involute after flowering. *Capsule* ½ in., clavate. *Seeds* narrowly winged.—DISTRIB. Europe, not N. or W. of the Loire and Rhine, N. Africa.—The var. *illyricus* differs from *communis* in the more slender fibres of the corm sheath; broader stigmas not papillose on the margin throughout their length; and narrower wing of the seed.

ORDER IV. AMARYLLIDEÆ.

Root bulbous. *Leaves* radical. *Scape* naked. *Flowers* bracteate. *Perianth* superior, coloured, of 6 lobes or segments in 2 series, with sometimes a crown at the mouth of the tube, regular or irregular. *Stamens* 6, on the perianth-tube or bases of the segments (rarely epigynous), filaments free or connate; anthers versatile, linear or oblong, bursting inwards or by terminal pores. *Ovary* ovoid or globose, 3-celled; style filiform or columnar, stigmas 1 or 3; ovules many, in 2 series, in the inner angles of the cells, anatropous. *Fruit* usually capsular, rarely fleshy, 3-celled, loculicidally 3-valved, cells 1- or more-seeded. *Seeds* turgid or compressed, testa various, albumen fleshy; embryo straight, axile, terete.—DISTRIB. Temp. and trop.; genera about 70; species 400.—AFFINITIES. Close with *Irideæ*, and *Liliaceæ*.—PROPERTIES. Emetic, narcotic and poisonous. *Agave* yields textiles, and a fermentable liquor (pulque).

Mouth of perianth with a circular crown.....1. Narcissus.
Crown 0. Outer perianth-segments largest.....2. Galanthus.
Crown 0. Perianth-segments equal.....3. Leucojum.

1. NARCIS'SUS, *L.*

Scape compressed. *Leaves* narrow, linear. *Flowers* with a membranous spathe, solitary or umbellate, large, white or yellow, drooping or inclined. *Perianth* tubular below; segments spreading, mouth surmounted with a circular crown. *Stamens* inserted in the tube, included within the

crown, filaments free or adnate to the tube; anthers versatile. *Ovary* 3-gonous; style filiform, stigma obtuse. *Capsule* coriaceous. *Seeds* globose, testa smooth, rough when dry.—DISTRIB. Europe, N. and W. Asia; species about 30.—ETYM. Mythological.

1. **N. Pseudo-narcis'sus,** *L.*; leaves nearly flat, flower solitary yellow campanulate, crown campanulate as long as the perianth-segments, margin crisped obscurely 6-lobed. *Daffodil, Lent Lily.*

Copses and moist woods throughout England, local; naturalized in Scotland and Ireland; fl. March–April.—*Bulb* 1 in., outer scales membranous. *Leaves* glaucous, obtuse. *Scape* 6–10 in. *Flower* primrose-yellow, 2 in.; pedicel short. *Perianth-lobes* acute. *Capsule* turbinate.—DISTRIB. Europe from Gothland southwards.

VAR. 1, *Pseudo-narcis'sus* proper; leaves slightly glaucous, perianth-segments oblong-lanceolate pale yellow, crown bright yellow with 6 rectangular lobes.—VAR. 2, *Bromfield'ii,* Syme; leaves very glaucous, perianth-segments broader, bright yellow, crown with 6 rounded lobes. The cultivated form.

N. BIFLO'RUS, *L.*; leaves keeled, flowers 1–3 yellow salver-shaped, crown short concave membranous.

Naturalized in England, Scotland, and Ireland, in copses and woods; fl. April–May.—*Bulb* 1–1½ in., outer scales membranous. *Leaves* very long, 10–18 in., hardly glaucous, obtuse. *Scape* as long, acutely 2-edged. *Perianth* 1½ in. diam., white or pale straw-coloured, pedicel slender; tube 1 in., slender; segments broadly ovate, obtuse; crown pale yellow.—DISTRIB. France, Tyrol, Italy, N. Africa?

2. GALAN'THUS, *L.* SNOWDROP.

Flowers solitary, pendulous, white; spathe membranous. *Leaves* 2, linear. *Scape* compressed. *Perianth* campanulate; sepals spreading; petals small, erect, notched. *Stamens* 6, epigynous; anthers pointed, connivent, pores 2 terminal. *Ovary* ovoid; style subulate, stigma simple. *Capsule* ovoid, herbaceous. *Seeds* few, subglobose, testa soft white.—DISTRIB. Europe; species 2.—ETYM. γάλα, *milk,* and ἄνθος, *flower.*

1. **G. niva'lis,** *L.*; leaves glaucous keeled.

Meadows and copses, frequently naturalized in England and Scotland, hardly in Ireland, possibly wild in Hereford and Denbigh; fl. Jan.–March.—*Bulb* ½ in., ovoid. *Leaves* 6–10 in., obtuse. *Scape* longer, prostrate in fruit; spathe 2-fid, 2-nerved; pedicel slender. *Flower* 1 in.; sepals obovate, concave; petals white, with a double green spot below the tip.—DISTRIB. Europe from Holland southwards, W. Asia.

3. LEUCOJ'UM, *L.* SNOW-FLAKE.

Characters of *Galanthus,* but leaves numerous; spathes 2, free or connate, 1–6-flowered; sepals and petals subequal; anthers obtuse, opening by slits; style clavate; testa crustaceous or fleshy.—DISTRIB. Chiefly European; species 9.—ETYM. λευκός, *white,* and ἴον, a *violet.*

1. **L. æsti'vum,** *L.*; leaves hibernal, flowers æstival, scape 2–6-fid.

Wet meadows, from Oxford and Suffolk to Kent and Devon; apparently wild by the Thames from Reading to the Isle of Dogs; a denizen, *Watson;* fl. May.—*Bulb* 1 in. *Leaves* 12–18 in., obtuse, subglaucous. *Scape* as long,

prostrate in fruit, 2-edged; tip of spathe entire, green. *Flowers* drooping, buds erect. *Sepals* ¾ in., ovate, white, tips green. *Fruit* turbinate. *Seeds* not caruncled.—DISTRIB. Europe from Denmark southwards.

2. **L. ver'num,** *L.*; leaves and flowers vernal, scape 1-2-flowered.

Copses near a farm-house, Bicester; hedgerows, Bridport, Dorset; an alien or denizen, *Watson;* fl. March-April.—Much smaller than *L. æstivum;* leaves subdistichous; scape less winged; spathe 2-fid at the tip; flowers about as large; ovaries more globose; seeds caruncled.—DISTRIB. Europe from France southwards and eastwards.

ORDER V. DIOSCOREÆ.

Rootstock often tuberous. *Stem* twining to the left, leafy. *Leaves* alternate, veins reticulate. *Flowers* inconspicuous, 1-sexual, in axillary panicles or racemes. *Perianth* herbaceous, superior in the female flower; segments 6, in two series, regular, persistent. *Stamens,* 6 inserted on the perianth-segments, free; anthers bursting inwards. *Ovary* 3-celled; styles 3, short, stigma entire or lobed; ovules 2, collateral or superposed, anatropous. *Fruit* 3-angled, 3-celled, indehiscent or loculicidally 3-valved, rarely a berry or 1-celled. *Seeds* winged, compressed or globose, albumen dense; embryo small.—DISTRIB. Chiefly trop.; genera 6; species about 100.—AFFINITIES. With *Smilaceæ.*—PROPERTIES. The acrid and poisonous yam tubers are nutritious when cultivated or boiled.

1. TAMUS, *L.* BLACK-BRYONY.

Perianth campanulate. *Stigmas* 2-lobed. *Berry* imperfectly 3-celled, few-seeded. *Seeds* globose.—DISTRIB. Europe, Mediterranean; species 1-2.—ETYM. Doubtful.

1. **T. commu'nis,** *L.*; leaves ovate-cordate acuminate.

Copses and hedges throughout England; most abundant in the south; absent from Ireland; fl. May-June.—*Rootstock* ovoid, black, fleshy, subterranean. *Stem* many feet long, very slender, angular, branched. *Leaves* 2-3 in., long-petioled, obscurely laterally lobed, 5-7-nerve, tip setaceous; stipules reflexed. *Flowers* ⅛ in. diam.; males solitary or fascicled on slender racemes which are branched at the base; female racemes 1 in., shorter, recurved, few-flowered; bracts minute. *Berry* ½ in., oblong, red.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia.

ORDER VI. ALISMACEÆ.

Marsh or aquatic scapigerous herbs. *Leaves* chiefly radical, base sheathing, erect or floating. *Flowers* usually 2-sexual, not on a spadix, spathe 0. *Perianth* inferior, of 6 (rarely 4) segments in 2 series, outer or all herbaceous. *Stamens* 6-9 or more, hypogynous, filaments free; anthers oblong. *Ovary* of 3, 6, or more carpels, free or slightly connate; styles short or 0, stigma terminal simple or feathery; ovules 1 or more in each cell, anatropous or campylotropous. *Fruit* of 3 or more indehiscent coriaceous carpels or dehiscent follicles. *Seeds* 1 or more in each carpel, testa coriaceous or membranous, albumen 0; embryo with a large radicle

next the hilum.—DISTRIB. All climates; genera 10; species about 50.—AFFINITIES. With *Naiadeæ*.—PROPERTIES unimportant.

TRIBE I. **ALIS'MEÆ.** *Leaf-blade* flat. *Petals* large, fugacious. *Stamens* 6 or more. *Ovules* 1–3, campylotropous. *Embryo* sharply curved.

Flowers 2-sexual, hexandrous. Carpels free ..... 1. Alisma.
Flowers hexandrous. Carpels connate, spreading ..... 2. Actinocarpus.
Flowers 1-sexual, polyandrous. Carpels free ..... 3. Sagittaria.

TRIBE II. **JUNCAGI'NEÆ.** *Leaves* linear or filiform. *Petals* small, green. *Stamens* 6. *Ovules* 1–3, anatropous. *Embryo* straight.

Anthers short. Carpels united till mature ..... 4. Triglochin.
Anthers long. Carpels free ..... 5. Scheuchzeria.

TRIE III. **BU'TOMEÆ.** *Leaves* 3-quetrous. *Petals* and *sepals* similar, pink. *Ovules* many, anatropous. *Embryo* straight ..... 6. Butomus.

1. ALIS'MA, *L.*

Roots fibrous. *Leaves* erect or floating. *Inflorescence* umbelled or panicled, branches whorled, bracteate. *Sepals* herbaceous. *Petals* deciduous, membranous, involute in bud. *Stamens* 6, filaments filiform; anthers versatile, dehiscence inwards. *Carpels* many, free; style ventral or terminal, short, stigma simple; ovules solitary, erect, campylotropous. *Achenes* turgid or compressed, ribbed, keeled or grooved, dehiscing or not. *Seed* erect, testa very thin; embryo hooked.—DISTRIB. Temp. and trop.; species 20.—ETYM. Doubtful.

1. **A. Planta'go,** *L.*; leaves erect, flowers panicled, carpels in one whorl laterally compressed, styles ventral. *Water Plantain.*

Ditches and edges of rivers, &c. from Ross southwards; rare in the N. of Scotland; fl. June–Aug.—*Base of stem* swollen, fleshy. *Leaves* 6–8 in., petioled, ovate-lanceolate, acute obtuse or subcordate at the base, 5–7-ribbed, young submerged or floating. *Scape* 1–3 ft.; pedicels 1–1½ in. *Flowers* ½ in. diam. *Petals* pink or rose, claw yellow. *Carpels* 20–30.—DISTRIB. Arctic and N. temp. regions, Himalaya, Australia.—Juice acrid.

VAR. 1, *Planta'go* proper; leaves subcordate, sepals oblong, styles twice as long as the ovary.—VAR. 2, *lanceola'tum,* With. (sp.); leaves lanceolate, sepals ovate, styles as long as the ovary.

2. **A. ranunculoi'des,** *L.*; leaves erect linear-lanceolate, flowers umbelled or whorled, carpels capitate 4–5-ribbed turgid, styles terminal.

Bogs and ditches, from Ross southwards; fl. May–Sept.—Tufted. *Leaves* petioled, blade 2–3 in., 3-ribbed; the first developed submerged, pellucid, sometimes floating. *Scape* 6–18 in.; pedicel 1–3 in. *Flowers* as in *A. Plantago. Ripe carpels* ovoid, apiculate.—DISTRIB. Europe from Gothland southwards except Turkey, N. Africa.

VAR. 1, *ranunculoi'des* proper; erect or suberect.—VAR. 2, *re'pens,* Davies (sp.); scape procumbent geniculate rooting. Lakes, N. Wales and Ireland.

3. **A. na'tans,** *L.*; radical leaves submerged, cauline floating, flowers few, carpels capitate turgid many-ribbed, styles terminal.

Lakes, very rare, N. and W. of England, from York to Hereford and Wales; near Stranraer in Scotland; W. of Ireland, rare and local; fl. July–Aug.—*Radical leaves* 2–8 in., submerged, subulate-lanceolate, pellucid. *Stem* floating and rooting, giving off long-petioled, oblong, floating leaves,

½–1 in., and 2–5 slender erect 1-flowered peduncles, 2–3 in., the uppermost umbellate. *Flowers* ½ in. diam., white, claw of petals yellow. *Ripe carpels* beaked.—DISTRIB. Europe N. of the Alps and Spain.

2. ACTINOCAR'PUS, *Br.* STAR-FRUIT.

Habit and inflorescence of *Alisma*, but carpels 6–8, connate at the base, spreading horizontally, 2-ovuled. *Fruit* of as many stellately spreading 1–2-seeded long-beaked carpels. *Seeds*, lower erect, upper horizontal, testa membranous rugose; embryo hooked. — DISTRIB. Europe, California, Australia; species 3.—ETYM. ἀκτὶν and καρπός, from the *rayed fruit*.

1. **A. Damaso'nium,** *Br.*; leaves narrow oblong 3–5-nerved, base cordate. *Damasonium stellatum*, Pers.

Gravelly ditches and pools, rare; southern counties from Salop and Suffolk to Sussex and Hants; fl. May–July.—*Leaves* many, 2 in., obtuse, floating or emersed; petioles stout, 2–5 in. *Scape* 4–6 in., stout, with usually 2 whorls of flowers; pedicels 1 in. *Flowers* ½ in. diam.; petals caducous. *Fruit* ¼ in. diam., carpels dehiscing ventrally. — DISTRIB. France, Spain, Italy, Dalmatia, Mid. Russia, N. Africa.

3. SAGITTA'RIA, *L.*

Habit and inflorescence of *Alisma*, but flowers usually 1-sexual; stamens numerous; anthers basifixed, dehiscence lateral.—DISTRIB. Temp. and trop.; species about 15.—ETYM. *sagitta*, an *arrow*.

1. **S. sagittifo'lia,** *L.*; leaves hastate obtuse or acute. *Arrow-head.*

Ditches, canals, &c. from Durham to Kent and Devon; naturalized in Scotland, rare and local in Ireland; fl. July–Sept.—*Stem* swollen at the base, stoloniferous. *Leaves* 2–8 in., erect, lobes long, more or less diverging, acuminate, the first developed submerged, pellucid, linear; petiole 8–18 in., stout, 3-gonous. *Scape* 6–18 in., with 3–5 distant whorls of 3–5 flowers each; bracts short, obtuse, membranous; lower whorls female, pedicel short; upper male with longer pedicels. *Flowers* ½ in. diam., males larger. *Petals* white, caducous, claw purple. *Anthers* purple. *Achenes* numerous, much compressed laterally, broadly obliquely obovate, apiculate, wings broad thick, cell small. *Seed* as in *Alisma*.—DISTRIB. Europe (Arctic), N. Asia, N.W. India.

4. TRIG'LOCHIN, *L.* ARROW-GRASS.

Root fibrous. *Leaves* erect, very narrow, flat or ½-terete. *Flowers* racemed, small, green, ebracteate. *Perianth-segments* 6, all similar, cucullate, subequal, deciduous. *Stamens* 6, on the base of the perianth-segments, filaments very short; anthers broad, bursting outwards. *Ovary* 6-celled; stigmas 3 or 6, feathery; ovules one in each cell or the alternate cells empty, anatropous. *Fruit* of 3–6 1-seeded coriaceous carpels, separating from a central axis and dehiscing in front. *Seeds* erect, terete, testa coriaceous.—DISTRIB. Temp. regions, many Australian; species about 10. —ETYM. τρεῖς and γλωχὶν, from the 3 pointed carpels.

1. **T. palus'tre,** *L.*; leaves filiform, ½-terete throughout, fruit clavate, carpels 3 slender long attached to the receptacle by a point.

Marshes and wet meadows; ascends to 2,000 ft. in the Highlands; fl. June–Aug.—*Stem* slightly swollen at the base, stoloniferous. *Leaves* 2–12 in.,

flaccid, faintly grooved on the upper surface. *Scape* slender, taller. *Raceme* elongating after flowering, pedicels short. *Perianth* purple-edged. *Anthers* purple. *Fruit* appressed to the scape. *Carpels* terete at the back, narrowed below, at length falling away from a 3-quetrous axis.—DISTRIB. Europe (Arctic), except Turkey, N. Africa, N. Asia, N.W. India, N. America.

2. **T. marit'imum,** *L.*; stems tufted thickened at the base, leaves slightly flattened at the tip, fruit oblong of 6 separable carpels.

Salt marshes; fl. May–Sept.—Larger and stouter than *T. palustre;* scape curved; raceme longer, not dense-flowered nor much elongating in fruit; flowers larger; fruit not appressed to the scape, and carpels grooved at the back.—DISTRIB. Coasts of Europe (Arctic), except Turkey, N. Africa, salt districts of N. and Central Asia, N. America.

5. SCHEUCH'ZERIA, *L.*

A small marsh herb. *Rootstock* creeping. *Leaves* erect, slender. *Scape* leafy; flowers racemose, bracteate. *Perianth-segments* 6, herbaceous, reflexed, connate at the base, persistent. *Stamens* 6, hypogynous, filaments short; anthers long, narrow, adnate to the filament, dehiscing outwards. *Ovary* of 3 carpels connate at the base, stigma sessile; ovules 2–3 in each carpel, basilar, anatropous. *Fruit* of 2–3 inflated spreading follicles. *Seeds* 1–2, erect, ovoid, testa coriaceous.—DISTRIB. Europe N. of the Alps (Arctic), N. Asia, Rocky Mts.—ETYM. Two *Schcuchzers,* Swiss botanists.

1. **S. palus'tris,** *L.*; leaves ½-terete, sheaths turgid.

Marshes, rare, Salop, Notts, Chester, York, Perth; absent from Ireland; fl. July.—*Rootstock* long, slender, clothed with old leaf-sheaths. *Leaves* 6–10 in., with dilated brown sheaths and a gland at the tip. *Scape* stout, curved. *Raceme* lax, few-flowered; pedicels much lengthened in fruit. *Perianth-segments* linear-oblong. *Ripe carpels* large for the plant.

6. BU'TOMUS, *L.* FLOWERING RUSH.

A tall marsh herb. *Rootstock* creeping. *Leaves* slender, erect. *Scape* naked. *Flowers* in a bracteate umbel. *Perianth-segments* 6, oblong, spreading, subequal, all coloured. *Stamens* 9, hypogynous, 6 in pairs opposite the outer segments, 3 opposite the inner, filaments subulate; anthers basifixed, oblong, dehiscence inwards. *Carpels* 6, beaked, connate below; styles short, stigmas sessile; ovules covering the walls of the carpel, anatropous, ascending. *Follicles* 6, beaked, coriaceous, turgid. *Seeds* many, minute, ascending, testa thin furrowed; embryo straight.—DISTRIB. Europe, Siberia, Dahuria, W. Asia to N.W. India.—ETYM. Obscure.

1. **B. umbella'tus,** *L.*; leaves long slender 3-quetrous, scape terete.

Ditches and river-sides from Cumberland and Durham southwards; naturalized in Scotland; rare in Ireland; fl. June–July.—*Rootstock* stout. *Leaves* 3–4 ft., base sheathing, twisted. *Flowers* many, 1 in. diam., rose-red; pedicels ½ in., lengthening in fruit to 2–4 in. *Anthers* and *carpels* red.

ORDER VII. NA'IADEÆ.

Submerged fresh- or salt-water plants. *Rootstock* usually creeping. *Stems* elongate (rarely 0), jointed, branched, slender. *Leaves* often floating,

alternate or distichous, rarely opposite, sheathing at the base, stipules 0 or sheathing and inserted within the petiole sheath. *Flowers* inconspicuous, 1–2-sexual, green. *Perianth* 0, or cup-shaped, or of 3–4 inferior valvate green sepals. *Stamens* hypogynous; anthers 1–2-celled. *Ovary* of 1–4 carpels; style 1, stigma various; ovules 1 in each carpel, rarely more, erect or pendulous. *Fruit* of one or more utricles achenes or drupes. *Seed* solitary, testa membranous, albumen 0; embryo straight or curved, radicle very large.—DISTRIB. All climates; genera about 20; species 100?—AFFINITIES. With *Alismaceæ*.—PROPERTIES. Unimportant.

TRIBE I. **POTAME'Æ.** *Spathe* 0. *Flowers* in spikes or clusters, solitary, 1–2 sexual. *Stigma* subcapitate or shortly decurrent. *Embryo* curved.

Flowers 2-sexual; sepals and stamens 4 each.....1. Potamogeton.
Flowers 2-sexual; perianth 0; stamens 4.....2. Ruppia.
Flowers 1-sexual; perianth cup-shaped; stamen 1.....3. Zannichellia.

TRIBE II. **NA'IADEÆ** proper. *Flowers* solitary, axillary, or on a spadix, 1-sexual, spathe 2-valved. *Stigmas* 1–3, slender. *Embryo* straight.

Flowers sessile on a flat linear spadix.....4. Zostera.
Flowers axillary.....5. Naias.

1. POTAMOGE'TON, *L.*

Aquatic herbs. *Leaves* submerged and translucent, or floating and opaque, alternate or opposite; stipules connate, membranous or 0. *Flowers* 2-sexual, in axillary or terminal spikes, spathe basal simple. *Perianth-segments* 4, small, herbaceous, clawed, persistent, valvate in bud. *Stamens* 4; anthers subsessile on the claw of the segments, 2-celled, dehiscence outwards. *Ovary* of 4 (rarely 1) free sessile carpels, stigma subsessile; ovule 1 in each carpel, ascending, campylotropous. *Drupes* 4 (rarely 1), small, green. *Seed* curved round a lateral process from the cell, testa membranous; embryo hooked or annular, radicular end large pointing downwards, plumule enclosed in the cotyledons.—DISTRIB. Temp. regions, more rare in trop.; species about 50.—ETYM. *ποταμός*, a *river*, and *γείτων*, a *neighbour*.

SECTION 1. *Leaves* alternate, or the upper opposite, oblong obovate or lanceolate, not truly linear, margins involute in bud; stipules free.

* *Flowering stem without barren branches below; upper leaves oblong floating, lower (rarely all) submerged; peduncles axillary many- and dense-flowered.*

1. **P. na'tans,** *L.*; submerged leaves 0 or linear or lanceolate, floating broader many-nerved, petiole usually slender, peduncle not enlarged upwards, stipules large not winged, dry drupe obovoid.

Ponds, lakes, and ditches; fl. July–Sept.—*Stem* terete. *Floating leaves* 2–6 in., oblong-ovate obovate or lanceolate, obtuse or acute at the base, olive-green, submerged paler; stipules 1–4 in. *Peduncles* very variable in stoutness and length. *Drupe* (dry) with the ventral margin convex, dorsal ½-circular, keeled below; beak short.—DISTRIB. Almost ubiquitous.

Sub-sp. NA'TANS proper; floating leaves coriaceous, blade decurrent along the petiole, submerged linear coriaceous, stipules large, peduncles stout, flowers large dense, dried drupe ⅛ in. green.—Common at low elevations.

Sub-sp. POLYGONIFO'LIUS, *Pourret* (sp.); leaves smaller, lower submerged linear

or obovate-lanceolate membranous rarely suberect and emersed, upper floating (var. *fluitans*) or erect, stipules large, peduncles slender, spike and flowers smaller, dried drupe $\frac{1}{10}$ in. red. *P. oblongus*, Viviani.—Lakes and pools, especially on heaths; ascends to near 1,600 ft. in the Lake District.

Sub-sp. PLANTAGIN'EUS, *Ducros;* leaves all more membranous ovate or oblong obtuse or cordate at the base, stipules shorter, peduncle more slender, dried drupe $\frac{1}{12}$ in. green.—Local.

Sub-sp. KIR'KII, *Syme;* lower leaves very narrow linear-lanceolate, upper sometimes submerged long-petioled oblong-lanceolate, stipules very long. *P. sparganiifolius*, Bab. not Læst.—Ma'am, Co. Galway.

2. **P. rufes'cens,** *Schrad.*; leaves translucent, lower submerged linear-lanceolate many-nerved, upper floating or erect rarely submerged broader subcoriaceous, petiole short, stipules large, peduncle stout not enlarged upwards, dry drupe ovoid acuminate. *P. fluitans*, Sm, not Schrad.

Ponds, canals, and ditches from Isla and Caithness southwards; ascends to 1,500 ft. in the N. of England; fl. July–Sept.—*Stems* terete, 1–4 ft. *Leaves* reddish, not toothed, upper 2–5 in., obovate or oblong-lanceolate, obtuse; lower sessile. *Stipules* not winged, obtuse, very variable. *Peduncle* 2–5 in.; spike stout. *Drupe* (dry) red, ventral margin convex, dorsal ½-circular keeled. —DISTRIB. Europe (Arctic), Siberia, Dahuria, N.W. India, N. America.—The acuminate fruit is a good character for this species.

** *Flowering stem with copious barren branches below; upper leaves floating, broader than the submerged lower; peduncles axillary and terminal, many- and dense-flowered.*

3. **P. heterophyl'lus,** *Schreb.*; stem slender, submerged leaves linear-lanceolate, stipules small, peduncles stout thickened upwards.

Pools, lakes, &c., rather local, from Kent and Dorset northwards; absent from Ireland; fl. July-Sept.—*Stem* terete, 2–4 ft., green or reddish. *Leaves,* submerged 1–3 in., sessile, flaccid, acuminate or cuspidate; floating 0, or similar, or oblong petioled and coriaceous. *Peduncles* axillary and terminal. *Drupe* (dry) $\frac{1}{12}$ in., ventral margin nearly straight produced into a short beak, dorsal ½-circular 3-keeled.—DISTRIB. Europe (Arctic).

Sub-sp. HETEROPHYL'LUS proper; leaves not amplexicaul almost flat, upper opposite coriaceous floating. *P. gramineus*, Fries and Koch.

Sub-sp. NI'TENS, *Weber;* (sp.) branches many rooting from the upper axils, leaves alternate all submerged recurved undulate, peduncles less thickened upwards, dried drupe smaller.—Bute, Perth, Elgin, Nairn, and Ireland, very rare. Foreign specimens (authentically named) approach *P. perfoliatus.*

Sub-sp. ? LONCHI'TIS, *Tuckerman* (sp.); leaves more linear, usually all submerged ½-amplexicaul straight 7–9-ribbed, upper long-petioled, peduncles slightly thickened upwards (drupe obliquely obovate, unknown in Britain, hence the identification is doubtful). *P. salicifolius*, Wolfg. ?—River Boyne.

4. **P. lanceola'tus,** *Sm.*; stem filiform fragile, leaves sessile straight linear- or oblong-lanceolate obtuse, upper opposite sometimes floating petioled, stipules slender acuminate, peduncles short not thickened upwards.

River Lligwey in Anglesea; fl. July–Aug.—Similar to slender forms of *P. heterophyllus,* but the leaves are darker green, very obtuse, usually narrower, and the axillary spike is very short ovoid. *Fruit* unknown, though the plant was discovered in 1808.—Syme doubtfully refers the *P. nigrescens* of Fries' *Mantissa* to this. Fries' *Herb. Normale* plant is quite different.

5. **P. lu'cens,** *L.*; stem stout. leaves large all translucent subsessile linear- or oblong-lanceolate undulate serrulate, upper opposite often floating, stipules large long 2-winged, peduncles robust thickened upwards.

Lakes, ponds, and streams from Aberdeen and Argyle to Devon and Kent; fl. July–Sept.—The largest British species, very lucid and glistening, pale green. *Stem* 3–5 ft. *Leaves* 4–10 in., chiefly submerged, very variable, many-nerved, most serrulate towards the long or short tip; upper rarely floating, broader. *Peduncles* very variable in length; spike stout, usually dense-flowered. *Drupes* (dry) $\frac{1}{10}$ in., convex on both faces, beak obtuse.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, N.W. India, N. America.—The following varieties are not constantly distinguishable.

VAR. 1, *lu'cens* proper; leaves shortly petioled strongly serrulate apiculate or mucronate, peduncles not twice as long as the spike.—VAR. 2, *acumina'tus,* Schum. (sp.); leaves shortly petioled narrow acuminate, peduncle more than twice as long as the spike.—VAR. 3, *decip'iens,* Nolte (sp.); leaves sessile cuspidate serrulate at the tip, stipules shorter scarcely winged, peduncles not twice as long as the spike. In a canal at Bath.

P. longifo'lius, Gay, is referred by Gren. and Godr. rightly to *P. lucens,* and is no doubt its var. *acuminatus.* The Lough Corrib plant, referred by Babington to Gay's *longifolius,* has much narrower not serrulate leaves, and small scattered flowers; only one specimen is known.

*** *Flowering stem with barren branches below; leaves ½ or wholly amplexicaul, all submerged, uniform, oblong or ovate-oblong, upper opposite.*

6. **P. prælon'gus,** *Wulf.*; stem stout, leaves usually concave at the tip ½-amplexicaul obtuse 3-nerved, stipules large obtuse not winged, peduncles long stout, spike stout, dry drupe sharply keeled.

Lakes and deep rivers, chiefly on the East from Nairn to Berks and Surrey; very rare in Ireland; fl. June–July.—Almost as large as *P. lucens* and much like it in habit, but barren branches few. *Stem* terete. *Leaves* 3–9 in., 1–1½ in. broad, linear-oblong, mid-rib dilated, its vascular bundles remote appearing like a band of parallel fibres, upper opposite. *Peduncles* usually longer than the leaves, hardly thickened upwards. *Spike* usually dense-flowered. *Drupe* (dry) much as in *P. lucens,* but more sharply keeled.—DISTRIB. Europe (Arctic), Himalaya, America.

7. **P. perfolia'tus,** *L.*; stem stout, leaves ovate-cordate amplexicaul obtuse quite entire 5–7-nerved, tip flat, stipules small subacute disappearing early, peduncles short stout, spike dense-flowered.

Ponds, lakes, and streams; ascending to 1,200 ft. in Yorkshire; fl. July–Sept.—*Stem* terete branches dichotomous. *Leaves* 1–2 in., upper opposite, translucent. *Peduncles* terminal in the forks, axillary, not thickened upwards. *Sepals* long-clawed. *Drupe* (dry) $\frac{1}{10}$ in., compressed, hardly keeled, beak short.—DISTRIB. Europe (Arctic), N. Africa, N.W. India, America.

8. **P. cris'pus,** *L.*; stem slender, leaves distichous ½-amplexicaul oblong acute or obtuse crisped serrulate 3-nerved, stipules small obtuse disappearing early, peduncles tapering upwards curved, flowers few small.

Ponds, ditches, &c. from Elgin and Isla to Devon and Kent; fl. July–Aug.—*Stem* dichotomously branched, compressed. *Leaves* 1½–3 in., close-set spreading or recurved. *Peduncles* stout or slender, laxly 6–8-flowered. *Drupe* (dry) $\frac{1}{8}$ in., obliquely ovoid, acuminate, compressed, beak long. DISTRIB. Europe, Siberia, India.

SECTION 2. *Leaves* all opposite, margins involute in bud; stipules 0.

9. **P. den'sus,** *L.*; stem slender, leaves subopposite distichous ovate-cordate 3–5-nerved, peduncles very short, spikes few-flowered.

Ponds and streams, from the Forth and Clyde to Devon and Kent; ascending to 1,000 ft. in the Lake District; very local in Scotland and Ireland; fl. July–Sept.—*Branches* dichotomous. *Leaves* ½–1 in., close-set, recurved, acute or acuminate, keeled, serrulate, translucent, apparently opposite, the nodes of the pairs being confluent, but their bases overlap. *Peduncles* rarely longer than the leaves, laxly 3–6-flowered. *Drupes* (dry) oblique, almost orbicular, compressed, sharply keeled, beak recurved.—DISTRIB. Europe from Denmark southwards, N. Africa.

SECTION 3. *Leaves* alternate, or the upper opposite, all similar, linear-ligulate, not broader in the middle, margins flat in bud; stipules free.

10. **P. compres'sus,** *L.*; stem compressed winged, leaves ½-amplexicaul acuminate 3–5-nerved, stipules large acuminate, peduncles longer than the spikes. *P. zosteræfolius,* Schum.; *P. cuspidatus,* Sm.

Lakes, ditches, &c. rare, from Forfar and Perth southwards; Co. Down in Ireland; fl. July–Aug.—*Stem* ⅛–¼ in. broad, internodes long, nodes constricted. *Leaves* 2–8 in., ⅛–¼ in. broad, dark green, with 3 strong and many slender nerves. *Spike* slender, interruptedly many-flowered. *Flowers* small. *Drupe* (dry) ⅛ in., subreniform, compressed, obtusely keeled; beak short, stout, recurved.—DISTRIB. Europe, N. America.—I follow Fries and Tuckerman in referring this to *P. compressus,* L., though not the plant of *Linn. Herb.*

Sub-sp. COMPRES'SUS proper; stem broad stout, leaves 4–8 in. often ¼ in. broad, peduncles 2–3 in. many-flowered, drupe ⅛ in. slightly gibbous at the base.—Perth, Forfar, Surrey, and Co. Down in Ireland.

Sub-sp. ACUTIFO'LIUS, *Link* (sp.); smaller, more slender, less branched, leaves 2–4 in. ⅛–⅛ in. broad more acute, peduncles and spike very short few, flowered, drupe ⅛ in. more curved toothed towards the base, beak longer.—Norfolk and Lincoln to Surrey and Dorset, rare; absent from Ireland.

11. **P. obtusifo'lius,** *Mert.* and *Koch;* stem slender compressed 4-gonous much branched, leaves sessile 2–3-nerved subacute or obtuse, stipules very obtuse, peduncles very short longer than the spike, drupe (dry) shortly beaked. *P. gramineus,* Sm. not L.

Ponds and ditches, rare, from Lanark and Kincardine to Devon and Kent; local and rare in Ireland; fl. July–Aug.—*Stem* flexuous, not winged. *Leaves* 2–6 in., ⅛–⅛ in. broad, dark green, rather opaque, with no nerves between the 3 principal; stipules ¼ in., tip broad. *Peduncles* much shorter than the leaves, terminal in the forks, equalling or exceeding the densely few-flowered spike. *Drupe* (dry) compressed, broadly obliquely ovoid, keeled; beak straight. In a specimen from Chilsworth (*Herb. Borrer*) the lateral nerves are absent or very obscure.—DISTRIB. Europe, W. Siberia, N. America.

12. **P. pusil'lus,** *L.*; stem filiform slightly compressed, leaves ¼-amplexicaul narrow linear 1–3-nerved acute, stipules small acute, peduncles terminal in the forks slender, spike few-flowered.

Rivers, ponds, and ditches, ascending to 1,000 ft. in the Highlands; fl. July–Aug.—*Stem* often much branched. *Leaves* ½–2 in., $\frac{1}{16}$–$\frac{1}{10}$ in. broad, rarely acuminate, rather opaque green. *Peduncles* usually much longer than the spike. *Spike* of 6–10 minute flowers. *Drupe* (dry) small, turgid, obliquely

ovoid, obscurely keeled ; beak subterminal, stout.—DISTRIB. Europe (Arctic), N. Africa, Siberia, N. America.

VAR. 1, *pusil'lus* proper ; leaves acute 3-nerved.—VAR. 2, *tenuis'simus*, Fries (sp.) ; smaller, leaves acuminate 1-3-nerved more spreading. *P. gracilis*, Bab. not Fries.—VAR. 3, *mucrona'tus*, Schrad. ; stem more compressed, leaves broader 3-nerved. *P. compressus*, Sm. Seems intermediate between *P. pusillus* and *obtusifolius*.

13. **P. trichoi'des,** *Cham.*; stem capillary repeatedly branched, leaves ½-amplexicaul setaceous 1-nerved, stipules acute, peduncles filiform much longer than the few-flowered spike, drupe solitary shortly beaked.

Muddy ponds and ditches in Norfolk ; fl. July–Aug.—*Stem* dichotomously and divaricatingly branched. *Leaves* 1–2 in., dark green, rigid, spreading, acuminate ; stipules slender. *Peduncles* curved, longer than the leaves. *Flowers* 3–6, very minute. *Drupe* (dry) $\frac{1}{12}$ in., compressed, obliquely ovoid, more or less tubercled on the dorsal face.—DISTRIB. Europe from Belgium southwards and eastwards to Austria, Italy, and Russia, N. America.

SECTION 4. *Leaves* all similar, submerged, truly linear, margins flat in bud ; stipules adnate to their bases and forming a sheath with them.

14. **P. pectina'tus,** *L.*; stem filiform, branches dense distichous, leaves very long linear or filiform acuminate 1–3-ribbed, peduncles usually long filiform, flowers few remote, drupes shortly beaked.

Ditches, canals, &c., fresh and brackish ; fl. June–July.—*Root* a small tuber. *Stems* repeatedly branched, forming dense masses. *Leaves* 3–8 in., $\frac{1}{16}$–$\frac{1}{8}$ in. broad, lower sometimes 3–5-nerved, sheathing portion often 1–1½ in., tip of the stipules free. *Peduncles* not thickened upwards. *Flowers* in interrupted whorls. *Drupes* very large for the plant, ⅛ in., dimidiate-obovoid turgid ; ventral margin slightly convex ; dorsal obscurely keeled.—DISTRIB Europe (Arctic), N. Africa, Siberia, India, N. America.

Sub-sp. PECTINA'TUS proper ; upper leaves setaceous 1-nerved channelled (composed of 2 parallel tubes) lower flat 3-ribbed, lateral keels of drupe conspicuous.—*P. mari'nus*, Huds., is a var. with stems naked below. Common in brackish and fresh water.

Sub-sp. FLABELLA'TUS, *Bab.* (sp.) ; leaves flat 3–5-nerved, lateral keels of drupe obscure. *P. zostera'ceus*, Bab. not Fries.—England and Ireland.

Sub-sp. FILIFOR'MIS, *Pers.* (sp.) ; leaves all setaceous 1-nerved channelled, drupe smaller not keeled. *P. marinus*, Linn. Herb.—Scotland and Ireland.

2. RUP'PIA, *L.*

Slender brackish-water herbs. *Leaves* submerged, filiform ; stipules sheathing. *Flowers* minute, 2-sexual, usually 2 on a short filiform peduncle (female greatly lengthening), arising from the spathaceous leaf-sheaths. *Perianth* 0. *Stamens* 4, filaments short broad ; anthers attached by the back ; cells reniform distant, dehiscence vertical ; pollen a curved tube with 1 median and 2 terminal nuclei. *Ovary* of 4 sessile carpels, stigma sessile peltate ; ovules 1 in each carpel, pendulous. *Drupes* long-pedicelled, ovoid, carried up on the greatly lengthened usually spirally coiled peduncle. *Seed* pendulous, testa thin ; radicle large ovoid, cotyledon small hooked subterminal.—DISTRIB. Temp. and trop. regions ; species 1 or more.—ETYM. *H. B. Ruppius*, a botanical author.

1. **R. marit'ima,** *L.*; leaves opposite and alternate.

Brackish ditches, &c. in England and Ireland, chiefly in the E. of Scotland; fl. July–Sept.—Habit of *Potamogeton pectinatus*. *Stem* filiform, much branched, 2 ft. and upwards. *Leaves* 1–3 in.; stipules adherent and forming the leaf-sheath. *Peduncle* short and straight in flower, then lengthening to 5–6 in. *Drupe* ⅛–¼ in., green, beaked, pedicels 1–2 in.—DISTRIB. All shores, temp. and trop.

Sub-sp. MARIT'IMA proper; sheaths inflated, fruiting peduncles spirally coiled, anther-cells oblong, drupe nearly straight, beak short. *R. spira'lis*, Hartm. —Yorkshire to Somerset; rare in Ireland.

Sub-sp. ROSTELLA'TA, *Koch* (sp.); sheaths appressed, fruiting peduncles short flexuous, anther-cells subglobose, drupe gibbous, beak longer.—Common; flowers earlier.

3. ZANNICHEL'LIA, *L.* HORNED POND-WEED.

Slender water-plants. *Leaves* submerged, usually opposite, linear; stipules adherent to the sheathing leaf-base. *Flowers* minute, 1- or 2-sexual, solitary or in pairs, sunk in the leaf-sheath. *Perianth* 0. *Stamen* 1; anther 2-celled, sagittate, cells adnate to the slender filament, dehiscence lateral, connective excurrent; pollen globose. *Ovary* of 4–6 carpels in a short sheath; styles long or short, stigma peltate persistent; ovule pendulous, anatropous. *Achenes* 4–5, sessile or pedicelled, oblong, curved. *Seed* pendulous, testa membranous; radicle large, clavate; cotyledon slender, twice folded.—DISTRIB. Temp. and trop.; species 1 or several.—ETYM. *Zannichelli*, a Venetian botanist.

1. **Z. palus'tris,** *L.*; achenes curved, keel tubercled.

Fresh and brackish ditches and pools; fl. May–Aug.—Annual. *Stem* 3–6 in., *filiform or setaceous; branches divaricate. Leaves 1–3* in., opposite, sub-whorled, often capillary. *Flowers* sessile or shortly pedicelled. *Achenes* narrow, ventral surface concave, dorsal convex.—DISTRIB. Europe, N. Africa, Siberia, India.

Sub-sp. PALUS'TRIS proper; ripe carpels subsessile spreading, dorsal face shortly winged and tubercled, style stout. *Z. major*, Hartm.

Sub-sp. PEDICELLA'TA, *Fries* (sp.); ripe carpels stipitate longer and narrower, dorsal face winged and tubercled, style long slender.

4. ZOSTE'RA, *L.* GRASSWRACK.

Grass-like marine plants; rootstocks matted, creeping. *Stem* compressed. *Leaves* distichous, sheathing, long, linear; stipules adherent to the sheathing leaf-base. *Flowers* in 2 parallel series of alternating anthers and ovaries on one surface of a linear membranous spadix, which is enclosed in the sheath of a pedicelled leaf-like spathe. *Perianth* 0. *Anthers* sessile, 1-celled, dehiscence longitudinal; pollen of simple slender cells. *Carpel* 1, ovoid, fixed laterally; style subulate, persistent, stigmas 2 capillary exserted from the spathe, deciduous; ovule pendulous from the point of attachment, orthotropous. *Fruit* membranous, dehiscing vertically. *Seed* ovoid, testa tough; embryo large, ovoid, with a small uncinate subulate plumule in a lateral fissure.—DISTRIB. Various coasts; species 2.—ETYM. ζωστήρ, a *riband.*

1. **Z. mari'na,** *L.* ; spathe dilated above the peduncle, its blade long, spadix many-flowered margin entire.

Muddy and sandy estuaries near low-water mark; fl. July–Sept.—*Rootstock* slender, rather fleshy. *Leaves* 1–3 ft., $\frac{1}{8}$–$\frac{1}{3}$ in. broad, obtuse, bright green, opaque, 1–7 nerved. *Spathe,* including the leafy portion, 6–10 in., varying in breadth as the foliage does. *Spadix* 1–3 in. *Flowers* green, usually in series of 2 anthers (perhaps one 2-celled anther) and an ovary. *Fruit* $\frac{1}{4}$ in. furrowed.—DISTRIB. Most temp. coasts (Arctic).

VAR. 1, *mari'na* proper; leaves $\frac{1}{4}$–$\frac{1}{3}$ in. broad 3–7-ribbed.—VAR. 2, *angustifo'lia,* Syme; leaves $\frac{1}{8}$–$\frac{1}{4}$ in. broad 1–3-nerved.

2. **Z. na'na,** *Roth;* spathe dilated above the peduncle, its blade short, spadix few-flowered, margin with inflexed membranous appendages.

Estuaries, rare, from Forfar and Argyle to Sussex and Dorset; Dublin Bay; fl. July–Sept.—Similar to *Z. marina,* var. *angustifolia,* but leaves not more than 6 in. by $\frac{1}{8}$–$\frac{1}{6}$ broad, 1–3 nerved; fruit shorter and very obscurely striate. —DISTRIB. Atlantic coast of Europe, N. Africa.

5. NA'IAS, *L.*

Very slender fresh-water herbs. *Leaves* submerged, linear, opposite fascicled or whorled; stipules adnate to the leaf-base. *Flowers* 1-sexual, solitary or crowded on short branchlets.—MALE. *Spathe* membranous, tubular, toothed. *Stamen* 1, filament at length elongating; anther subsessile, 4-celled; pollen large, globose.—FEMALE naked. *Carpel* 1, ovoid, sessile; style short, stigmas 2–4 persistent subulate; ovule basal, erect, anatropous. *Drupe* small, epicarp thin, separable. *Seed* ovoid, testa thin; embryo ovoid, oblong, radicular end largest.—DISTRIB. Various climates; species 8.—ETYM. *vaïas,* a *water-nymph.*

1. **N. flex'ilis,** *Rostkov.*; leaves opposite or 3 in a whorl.

Lakes near Roundstone, Connemara; female plant only; fl. Aug.–Sept.—*Stem* filiform, branched, brittle. *Leaves* $\frac{1}{2}$–1 in., very slender, linear, quite entire or remotely serrulate; sheaths ciliate. *Flowers* monœcious, 2–3 or solitary. *Drupe* $\frac{1}{8}$ in.—DISTRIB. Europe, Asia, America.

ORDER VIII. LILIA'CEÆ.

Root bulbous or fibrous, or rootstock creeping. *Stem* rarely shrubby or arborescent. *Flowers* 2- rarely 1-sexual. *Perianth* herbaceous, petaloid, inferior; segments 6 in 2 series, rarely 4, 8, or 10, free or connate; imbricate (rarely valvate) in bud. *Stamens* 6 (3 in *Ruscus*) hypogynous or inserted on the perianth, filaments long or short; anthers oblong or linear. *Ovary* 3-celled; styles 1 or 3, rarely 0, stigma simple or 3-lobed; ovules 2 or more in the inner angle of each cell, anatropous. *Fruit* a 3- rarely 1–2-celled capsule or berry. *Seeds* 1 or more in each cell, albumen horny or fleshy; embryo small, often minute, terete, radicle next to or distant from the hilum.—DISTR'B. All climates; genera about 170; species about 1,500.—AFFINITIES. With *Juncæ.*—PROPERTIES various.

SERIES 1. *Rootstock* creeping. *Fruit* a berry.

TRIBE I. **TRILLIDE'Æ.** *Stem* with 1–2 whorls of reticulate-veined leaves. *Flowers* not jointed on the pedicel. *Styles* free. *Testa* coriaceous or fleshy. *Radicle* next the hilum.... .....1. Paris.

TRIBE II. **ASPARAGI'NEÆ.** *Pedicel* jointed. *Styles* combined or stigma sessile. *Testa* various. *Radicle* far from the hilum.

* *Stem branched. Flowers often* 1-*sexual.*

Flowers axillary, pedicels jointed in the middle.....2. Asparagus.
Flowers on the surface of a leaf-like branch.....3. Ruscus.

** *Stem simple. Flowers* 2-*sexual.*

Scape leafless. Flowers racemose, subglobose.....4. Convallaria.
Stem leafy. Perianth tubular, 6-cleft.....5. Polygonatum.
Stem 2-leaved. Perianth-segments 4.....6. Smilacina.

SERIES 2. *Root* of thick fleshy fibres. *Fruit* capsular, loculicidal.

TRIBE III. **ANTHERI'CEÆ.** *Flowers* jointed on the pedicel. *Style* simple. *Testa* black, brittle. *Radicle* next the hilum.....7. Simethis.

SERIES 3. *Root* bulbous. *Flowers* not jointed on the pedicel. *Fruit* capsular.

TRIBE IV. **LILIE'Æ.** *Styles* combined or stigma sessile. *Capsule* loculicidal. *Testa* various. *Radicle* next the hilum.

* Scape leafless. Flowers usually bracteate.

Flowers racemose or subracemose.

Perianth-segments free, blue or pink.....8. Scilla.
Perianth globose, 6-toothed.....9. Muscari.
Perianth-segments free, white.....10. Ornithogalum.

Flowers umbelled, capitate or corymbose.

Bracts of 1–2 large membranous spathes.....11. Allium.
Bracts of 1–2 linear green leaves.....12. Gagea.

** Stem leafy. Flowers usually ebracteate, segments free.

Flower subsolitary, small, white. Nectary transverse.....13. Lloydia.
Flower large drooping. Nectary oblong.....14. Fritillaria.
Flower solitary, large. Nectary 0. Stigma sessile.....14*. *Tulipa.*
Flowers many, large. Nectary 0. Style long.....14**. *Lilium.*

TRIBE V. **COLCHICE'Æ.** *Styles* free. *Capsule* septicidal. *Testa* various. *Radicle* distant from the hilum.....15. Colchicum.

SERIES 4. *Rootstock* creeping. *Fruit* capsular.

TRIBE VI. **VERA'TREÆ.** *Styles* free. *Capsule* septicidal. *Testa* thin, sometimes lax at each end. *Radicle* next the hilum.....16. Tofieldia.

TRIBE VII. **NARTHE'CIEÆ.** *Style* very short. *Capsule* loculicidal. *Testa* produced and filiform. *Radicle* next the hilum.....17. Narthecium.

1. PAR'IS, *L.* HERB PARIS.

Rootstock stout. *Stem* simple, with 1 whorl of usually 3–9 leaves. *Sepals* 3–5, lanceolate. *Petals* as many, filiform. *Stamens* 6–12, hypogynous; anthers adnate, cells narrow; connective sometimes produced. *Ovary* subglobose, 4–6-lobed and -celled; styles 4–6, free, stigmas decurrent; cells 4- or more-ovuled. *Berry* indehiscent or 4–6-valved. *Seeds* few or many, testa coriaceous or fleshy, albumen horny; embryo terete, radicle next the hilum.—DISTRIB. Europe, N. Asia, Himalaya; species 2–3.—ETYM. *par, equal,* from the 4-nary parts of *P. quadrifolia.*

1. **P. quadrifo'lia,** *L.*; leaves ovate-oblong or obovate.

Woods from Renfrew and Moray southwards, local; absent from Ireland; fl. May–June. — Glabrous. *Rootstock* white, creeping. *Stem* 6–12 in., terete, leafy at the top, sheath basal. *Leaves* 4 (rarely 3–8), 3–5 in., acute, 3–5-nerved. *Flower* 1½–1¾ in. diam., solitary; peduncle ½–3 in., erect. *Sepals* green, acuminate. *Petals* as long, yellow. *Connective* much produced. *Berry* 4–6-celled, black, bursting irregularly. *Seeds* black, testa coriaceous.—DISTRIB. Europe (Arctic), Siberia, W. Asia.—*Rootstock* purgative.

2. ASPAR'AGUS, *L.* ASPARAGUS.

Rootstock stout, creeping. *Stem* slender, branched, terete or angled (sometimes spiny and climbing). *Leaves* minute scales, bearing in their axils fascicles of needle-like branches (cladodes). *Flowers* small, 1–2-sexual, pendulous, axillary; pedicel jointed. *Perianth* campanulate, segments connate at the base. *Stamens* on the base of the segments; anthers oblong. *Ovary* 3-gonous; styles combined, stigmas 3; cells several-ovuled. *Berry* globose. *Seeds* 3–6, testa black brittle; embryo dorsal, clavate, radicle far from the hilum.—DISTRIB. Temp. and trop. Asia, Africa; species 60–70.—ETYM. The old Greek name.

1. **A. officina'lis,** *L.*; stems erect terete flexuous, branches slender.

Coasts of England, from Anglesea and Suffolk southwards, rare and local; naturalized only in Scotland; S.E. of Ireland; fl. June–Aug.—*Stem* 1–2 ft., annual; young shoots scaly below, scales triangular. *Cladodes* ¼–½ in. *Flowers* 1–2, ¼–¾ in., axillary, dirty white, or yellow with red veins; pedicel as long, jointed at the middle. *Berry* ¼ in. diam., red.—DISTRIB. Europe, N. Africa, Siberia; introd. in N. America.—Diuretic. The origin of the garden Asparagus, cultivated since the Roman period.

3. RUS'CUS, *L.* BUTCHER'S BROOM.

Shrubby, evergreen, subdiœcious. *Rootstock* stout, creeping. *Leaves* minute scales, bearing in the axils leaf-like branches (cladodes). *Flowers* minute, often on the face of the cladode. *Perianth* herbaceous, persistent; segments 6, spreading, inner smaller, all partially valvate in bud. *Stamens* 3, filaments connate in a short stout column; anthers sessile, cells diverging below. *Ovary* enclosed in a fleshy cup (staminal) 3-celled; style short, stigma discoid; ovules few. *Berry* usually 1-celled. *Seed* 1, globose, or 2, plano-convex; testa thin, adherent, albumen horny; embryo minute, lateral, radicle far from the hilum.—DISTRIB. Temp. Europe, W. Asia, N. Africa; species 4–5.—ETYM. Obscure.

1. **R. aculea'tus,** *L.*; cladodes ovate rigid spinescent.

Copses and woods, from Suffolk and Glamorgan southwards, rare; naturalized in Scotland and Ireland; fl. Feb.–April.—*Stems* 10–24 in., tufted, branched, erect, stout, angled, shoots scaly when young. *Cladodes* ½–1½ in., twisted at the base. *Flowers* 1–2, ⅛ in. diam., bracteate and bracteolate, males on narrower cladodes, very shortly pedicelled. *Berry* ½ in. diam., bright red.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia.

4. CONVALLA'RIA, *L.* LILY OF THE VALLEY.

A stemless herb. *Rootstock* creeping. *Leaves* 2–3, sheathed at the base. *Scape* slender; flowers racemose. *Perianth* shortly campanulate, segments connate, tips free recurved. *Stamens* on the base of the perianth, included; anthers subsagittate. *Ovary* ovoid, terete; style simple, stigma 3-gonous; cells 2-ovuled. *Berry* globose. *Seeds* 2–3, subglobose, testa thin white adherent, albumen horny; embryo dorsal, radicle far from the hilum.—DISTRIB. Europe, N. Asia.—ETYM. *convallis*, a *valley*.

1. **C. majalis,** *L.*; leaves ovate-lanceolate petioled.

Woods from Moray to Kent and Somerset; ascending to 1,000 ft. in the N. of England; naturalized in Scotland and Ireland; fl. May–June.—*Leaves* 6–8 in.; petiole long, slender, sheathing. *Scape* 6–10 in., angular; bracts membranous; raceme 6–12-flowered; pedicels curved. *Flowers* ½ in. diam., white, drooping, almost globose. *Berry* red.

5. POLYGONA'TUM, *Tournef.*

Rootstock creeping. *Stem* leafy. *Leaves* alternate opposite or whorled. *Flowers* axillary, solitary or racemed, pendulous, white green or purplish, ebracteate. *Perianth* tubular-campanulate, mouth 6-cleft, outer lobes subvalvate with replicate edges. *Stamens* on the middle of the tube, included. *Ovary* and *fruit* of *Convallaria*.—DISTRIB. Europe, N. Asia, Himalaya, N. America; species about 20. — ETYM. πολύς and γόνυ, alluding to the *many* nodes (*knees*).

1. **P. verticillatum,** *All.*; stem angled, leaves whorled narrow-lanceolate, filaments papillose.

Wooded banks and glens, Bellingham Northumberland; Athol, Rattray and Dunkeld in Perthshire; fl. June–July.—*Stem* 2–3 ft. *Leaves* 3–5 in., sessile, 3–6 in a whorl (rarely 1 or 2), flaccid, margins and veins beneath ciliolate. *Peduncles* ½–¾ in., 1–3-flowered. *Perianth* ¼ in., greenish, contracted in the middle. *Berry* ¼ in. diam.—DISTRIB. Europe (Arctic), Siberia, Himalaya.

2. **P. multiflorum,** *All.*; stem terete, leaves alternate subbifarious or secund oblong ½-amplexicaul, filaments pubescent. *Solomon's Seal.*

Woods, from York to Kent and Devon; rare and often naturalized, as in Scotland and Ireland; fl. May–June.—*Stem* 2–3 ft., naked below, arched. *Leaves* 3–5 in., very shortly petioled, acute or obtuse. *Peduncles* 2–5-flowered. *Perianth* ¾ in., greenish-white, constricted in the middle. *Berry* ½ in. diam., blue-black.—DISTRIB. Europe, Siberia, Dahuria.

3. **P. officinale,** *All.*; stem angled, leaves alternate oblong subbifarious ½-amplexicaul, filaments glabrous.

Wooded limestone cliffs, from the Border to Somerset and Wilts; rare and local; absent from Ireland and Scotland; fl. May–June.—*Stem* 6–12 in., arched. *Leaves* 3–4 in., subacute. *Peduncles* 1–3-flowered. *Perianth* 1 in., greenish-white, tubular, constricted at the base. *Berry* ¼ in. diam., blue-black.—DISTRIB. Europe, Siberia, Dahuria.

6. SMILACI'NA, *Desf.*

Rootstock slender, creeping. *Stem* erect, leafy. *Leaves* alternate. *Flowers* white, terminal, racemed. *Perianth* of 4 free segments in 1 series,

or 6 in 2 series, deciduous. *Stamens* 4 or 6, on the bases of the perianth-segments. *Ovary* 2–3-celled; style short, simple, stigma obscurely 2–3-lobed; cells 1–2-ovuled. *Berry* and *seeds* as in *Convallaria*.—DISTRIB. N. temp. zone; species about 10.—ETYM. Diminutive of *Smilax*.

1. **S. bifo'lia,** *Ker;* leaves cordate acute. *Maianthemum*, Desf.

Woods, very rare, wild at Hackness, Yorkshire, and probably in Lancashire and Bedfordshire; fl. May–June.—Glabrous or pubescent. *Stem* 4–8 in., flexuous. *Radical leaves* 1½–2½ in., base deeply 2-lobed, many-nerved, long-petioled; cauline 2–3, short-petioled or upper sessile. *Raceme* 1–2 in., 8–10-flowered; pedicels slender, solitary or 2–3; bracts minute. *Flowers* ¼ in. diam., 4-merous, suberect, fragrant. *Berry* ¼ in. diam., apiculate, white, dotted.—DISTRIB. Europe (Arctic), excl. Turkey, N. Asia, N. America.

7. SIMETHIS, *Kunth.*

A slender herb. *Root* of fascicled fibres. *Leaves* radical, grassy. *Scape* panicled, bracteate. *Flowers* jointed on the pedicel. *Perianth* spreading, deciduous; segments 6, almost free. *Stamens* 6 on the base of the perianth-segments, filaments woolly below; anthers oblong. *Ovary* subglobose, 3-celled; style slender, stigma a point; ovules 2 in each cell, superposed. *Capsule* 3-celled. *Seeds* 6, subglobose, arillate, testa black crustaceous shining; embryo long, radicle towards the hilum.—DISTRIB. S.W. France, Spain, Corsica and Sardinia, N. Africa.—ETYM. Classical.

1. **S. bi'color,** *Kunth;* leaves linear acuminate. *S. planifolia*, Woods.

Fir woods, Bournemouth; Derrynane, Ireland; an alien or denizen, *Watson;* fl. June.—*Root-fibres* stout. *Leaves* 6–18 in., ¼ in. diam., recurved, surrounded at the base with torn fibrous brown sheaths, flat or concave. *Scape* as long, dichotomously branched; bracts slender; pedicels rigid, slender. *Flowers* ⅜ in. diam., corymbose; segments oblong, obtuse, concave, purple on the back, white inside. *Capsule* obtusely angled, ¼ in. diam.

8. SCILLA, *L.* SQUILL.

Bulb coated. *Leaves* radical, linear. *Flowers* usually racemose, blue, rarely purple or white. *Perianth* deciduous; segments 6, spreading or conniving, free or nearly so; nectary 0. *Stamens* 6, on the base of the perianth-segments or above it, filaments subulate; anthers oblong. *Ovary* ovoid; style filiform, stigma minute; ovules 4 or more in each cell. *Capsule* 3-angled, loculicidally 3-valved. *Seeds* many, testa black, albumen fleshy; embryo terete, radicle next the hilum.—DISTRIB. Chiefly Europe and W. Asia; species about 60.—ETYM. Classical.

SECTION 1. *Perianth-segments* free, spreading; stamens inserted on their bases; anthers purple. *Seeds* angular.

1. **S. ver'na,** *Huds.*; leaves vernal preceding the subcorymbose flowers, bracts as long as the pedicels or longer.

Rocky pastures on the coast, very local, from Cornwall to Shetland; E. and N.E. of Ireland, very rare; fl. April–May.—*Bulb* as large as a hazel-nut. *Leaves* 3–10 in., ⅛–⅛ in. broad, recurved, concave. *Scapes* 1–2, shorter than the leaves. *Flowers* ½ in. diam., bright-blue, fragrant; lower pedicels ½ in. *Capsules* ⅛ in. diam.—DISTRIB. Coasts of France and Spain.

2. **S. autumna'lis,** *L.*; leaves autumnal narrow succeeding the shortly racemose flowers, bracts 0.

Rocks and pastures from Gloucester and Cornwall to Kent, Channel Is.; fl. July–Sept.—*Bulb* ¾–1½ in. diam. *Leaves* 3–6 in., ½-terete, grooved above. *Scapes* several, equalling the leaves. *Flowers* ½ in. diam., reddish purple; pedicels ascending or spreading. *Capsule* small.—DISTRIB. W. Europe from France and Belgium southwards, N. Africa.

SECTION 2. *Perianth* campanulate, segments connate at the base; stamens below their middle; anthers yellow. *Seeds* subglobose.

3. **S. nu'tans,** *Sm.*; leaves and flowers vernal, bracts in pairs. *Agraphis,* Link; *Hyacinthus nonscriptus,* L. *Bluebell, Wild Hyacinth.*

Woods, banks, &c., from Ross southwards; ascends to 1,500 ft. in the Lake District; fl. April–June.—*Bulb* ¾–1 in. diam. *Leaves* 10–18 in., ½ in. broad, subacute, concave. *Scape* solitary, tall, stout. *Raceme* 6–12-flowered; bracts linear, membranous. *Flowers* 1 in., blue-purple white or pink, drooping; pedicels short, curved, erect in bud and fruit. *Capsule* subglobose.—DISTRIB. W. Europe from Belgium southwards and east to Illyria.

9. MUS'CARI, *Tourn.* GRAPE HYACINTH.

Perianth globose, mouth 6-fid. *Stamens* on the middle of the tube, included, filaments very short; anthers short. *Ovary* ovoid, deeply 3-lobed; style short, stigma simple; cells few-ovuled. *Capsule* 3-quetrous, loculicidally 3-valved. *Seeds* 6 or fewer, as in *Scilla.*—DISTRIB. Europe, W. Asia; species 15–20.—ETYM. From the *musky* scent.

1. **M. racemo'sum,** *Miller;* leaves slender prostrate flexuous.

Sandy pastures, Packenham and Cavenham, Suffolk; Hinton, Cambridge; a denizen, *Watson;* fl. May.—*Bulb* small, with bulbils at the base. *Leaves* 6–10 in., ½-terete, grooved above. *Scape* short. *Raceme* short, cylindric many-flowered; rachis dilating after flowering; pedicels slender, lengthening in fruit; bracts minute. *Flowers* ⅛ in. diam., dark blue, upper imperfect. *Capsule* ¼ in.—DISTRIB. Europe from Belgium southwards, N. Africa.

10. ORNITHO'GALUM, *L.*

Bulb coated. *Leaves* all radical, linear. *Flowers* racemose or corymbose, white. *Perianth* spreading, persistent; segments 6, free, with a basal nectariferous gland. *Stamens* 6, hypogynous, filaments flattened; anthers versatile, linear-oblong. *Ovary* 3-quetrous, with 3 glands on the top; style 3-gonous, stigma obtuse; cells many-ovuled. *Capsule* grooved, loculicidally 3-valved. *Seeds* terete or angled, testa black, rough when dry; embryo cylindric, radicle next the hilum.—DISTRIB. Europe, N. and W. Asia, N. Africa; species 50–60.—ETYM. The classical name

1. **O. pyrena'icum,** *L.*; raceme cylindric many-flowered, pedicels spreading, filaments much dilated to above the middle.

Woods and copses, local, Somerset, Wilts, Gloucester, Bedford, Sussex; fl. June–July.—*Bulb* 2 in., ovoid. *Leaves* 1–2-flowered, ½–½ in. diam., vernal, concave, glaucous, withered at the flowering season. *Scape* tall, stout. *Raceme* 4–8 in., very many-flowered; bracts subulate. *Perianth* 1 in. diam.; segments narrow-oblong, green, margins white inside. *Capsule* ½ in.—

DISTRIB. Europe from Belgium southwards.—Young shoots eaten, sold at Bath, and called French Asparagus.

O. UMBELLA'TUM, *L.*; corymbs 6–10-flowered, pedicels slender suberect, filaments broadly subulate. *Star of Bethlehem.*

Copses, meadows, &c., naturalized; fl. May–June.—*Bulb* 1 in., with many bulbils. *Leaves* 6–8 in., ¼ in. broad, concave, green with a white stripe. *Scape* tall; rachis of corymb elongate after flowering; bracts very long. *Perianth* 1–1½ in. diam.; segments linear-oblong, white with a dorsal green midrib. *Capsule* obovoid.—DISTRIB. Europe from Sweden southwards.

O. NU'TANS, *L.*; racemes few-flowered drooping, filaments broadly dilated upwards 3-fid.

Copses, &c., Midland and E. counties from Yorkshire and Durham to Hereford, naturalized; fl. April–May.—*Bulb* 2 in. *Leaves* 1–2 ft., ¼–½ in. broad, concave, glaucous with a white stripe. *Scape* as long; bracts long, slender; pedicels curved, ¼–½ in. *Perianth* 1–1½ in. broad; segments lanceolate, white with a dorsal green midrib. *Capsule* pendulous, broadly ovoid, green, fleshy.—DISTRIB. Europe from Sweden southwards.

11. AL'LIUM, *L.*

Fœtid, pungent herbs. *Bulb* coated. *Leaves* radical, flat or terete. *Flowers* capitate or umbelled; spathes 1–2, membranous. *Perianth-segments* 6, free, spreading or campanulate. *Stamens* 6, hypogynous or on the base of the segments, filaments free or connate below; anthers oblong. *Ovary* 3-gonous, style filiform, simple or 3-cleft, stigmas simple; ovules few in each cell. *Capsule* membranous, top depressed, 3-lobed, loculicidally 3-valved. *Seeds* 1–2 at the base of each cell, turgid or compressed, testa black; embryo curved, excentric, radicle next the hilum.—DISTRIB. N. temp. regions; species 150.—ETYM. The Latin name for Garlic.

SECTION 1. **Por'rum.** *Leaves* sheathing the scape to the middle. *Perianth-segments* erect. *Three outer filaments* broader, tips 3-fid; lateral cusps subulate, about as long as the antheriferous.

* *Leaves fistular.*

1. **A. vinea'le,** *L.*; leaves flattened or grooved above, spathe solitary short with a long beak, head globose usually bulbiferous. *Crow Garlic.*

Pastures and waste dry places, from Lanark and Aberdeen southwards, not frequent; S. and E. of Ireland; fl. June.—*Bulb* small. *Leaves* 8–24 in., strict. *Scape* longer, cylindric. *Flowers* ½ in., green or pink; pedicels slender, thick at the tip. *Filaments* exposed. *Bulbils* ¼ in., green or purplish.—DISTRIB. Europe, Canaries; introd. in N. America.

VAR. 1, *vinea'le* proper; heads with flowers and bulbils, perianth-segments olive, midrib pink. Sandhills, rare.—VAR. 2, *capsuli'ferum,* Syme; bulbils 0, perianth-segments pink. Jersey.—VAR. 3, *compac'tum,* Thuill. (sp.); heads 1 or 2 together, all of bulbils. The common form.

2. **A. sphæroceph'alum,** *L.*; leaves terete or flattened or grooved above, spathes 2 shortly beaked, head globose dense-flowered.

St. Vincent's Rocks, Bristol; St. Aubyn's Bay, Jersey; fl. June–Aug.—Habit of *A. vineale,* but ribs of leaf rough when young, and heads dense, globose, red-purple, without bulbils.—DISTRIB. Europe from Belgium southwards.

** *Leaves not fistular, glaucous.*

3. **A. Scorodop'rasum,** *L.*; leaves flat keeled, edges scabrid, sheaths 2-edged, spathes 2 shortly beaked, heads bulbiferous, stamens not exserted. *A. arenarium,* Sm. *Sand Leek.*

Dry pastures and copses, rare, York and Lancaster, to Kirkcudbright, Berwick, Fife and Forfar; fl. May–Aug.—*Bulb* ovoid, with small stalked bulbils. *Leaves* 6–8 in. ⅛–⅜ in. broad. *Scape* slender. *Head* lax-flowered; bulbils purple; pedicels slender. *Perianth* ½ in., segments red-purple, margins white, keel of outer scabrid.—DISTRIB. Europe, except Spain.

4. **A. Ampelop'rasum,** *L.*; leaves distichous folded, edges scabrid, sheaths cylindric, spathe 1 with a compressed long beak, head often bulbiferous, anthers exserted. *Wild Leek.*

Rocky banks, &c., England, naturalized only; wild in W. Ireland; fl. July–Aug.—*Bulbs* large, with often stalked bulbils. *Leaves* 1–2 ft., 1–1½ in. broad. *Scape* 3–6 ft., very stout. *Heads* globose, 3–4 in. diam., very many-flowered, pedicels unequal. *Perianth* ½ in., white or greenish.—DISTRIB. Switzerland, Europe S. of the Alps, W. Asia.

VAR. 1, *Ampelop'rasum* proper; head compact, bulbils 0. Steep Holmes in the Severn.—VAR. 2, *bulbif'erum,* Syme; head compact, bulbils few. Guernsey.—VAR. 3, *Babingto'nii,* Borrer (sp.); flowers few, bulbils very many, pedicels sometimes proliferous. *A. Halleri,* Bab. Dorset and Cornwall, doubtfully wild; Roundstone and Great Arran Is., Ireland.

SECTION 2. **Codono'prasum.** *Perianth-segments* erect or spreading. *Filaments* all simple or obscurely 3-fid.

5. **A. Schœno'prasum,** *L.*; leaves fistular, heads dense-flowered, bulbils 0, spathes 2 shortly beaked, stamens included. *Chives.*

Rocky pastures, very rare, N. of England and Cornwall; absent from Ireland; a native? *Watson;* fl. June–July.—*Bulbs* narrow, small, tufted on short rootstocks. *Leaves* 4–10 in., few, terete or grooved above. *Scapes* 6–14 in., stout or slender, hollow. *Perianth* ½–¾ in., campanulate, pale purple; pedicels short, bulbils 0. *Stamens* connate at the very base. *Capsule* globose, small.—DISTRIB. Mid. Europe. N. Asia, Himalaya, N. America.

VAR. 1, *Schœno'prasum* proper; leaves straight, ribs smooth or scaberulous, perianth-segments gradually acuminate. N. of England.—VAR. 2, *sibiri'cum,* L. (sp.); larger, leaves recurved, ribs more scabrid, perianth-segments abruptly acuminate. *A. arenarium,* Sm. in *Eng. Bot.* Kynance Cove.

6. **A. olera'ceum,** *L.*; leaves nearly flat or ½-terete sheathing the cylindric scape to the middle, heads lax-flowered bulbiferous, spathes 2, beaks slender unequal, stamens equalling the perianth. *Field Garlic.*

Borders of fields, &c., rare, from Fife and Forfar to Devon and Kent; absent from Ireland; fl. July.—*Bulbs* small *Leaves* very slender, variable in breadth and thickness, flat towards the tip, with many striæ, ribs rough. *Scapes* 10–18 in., very slender. *Heads* lax-flowered; pedicels flexuous, spreading; spathes 2–4 in. *Perianth* campanulate, segments obtuse, pale olive-green pink or brownish. *Stamens* included, filaments shortly connate, subulate.—DISTRIB. Europe, W. Siberia, Himalaya.

VAR. 1, *olera'ceum* proper; leaves narrow ½-terete subfistular grooved above. Devon, Somerset, Gloucester.—VAR. 2, *complana'tum,* Fries (Boreau, sp.);

leaves broader linear almost solid nearly flat. *A. carinatum*, Sm. not L. Yorkshire and Northumberland.

7. **A. carina'tum**, *L.*; leaves linear channelled sheathing the cylindric scape to the middle, heads bulbiferous, spathes 2, beaks long slender very unequal, stamens at length twice as long as the perianth.

Near Newark; fl. Aug.—Very similar to *A. oleraceum*, but at once distinguished by the long filaments. *Leaves* flat towards the tip, with 3–5 striæ. *Flowers* bright rose-pink.—DISTRIB. Europe, except Spain.

8. **A. trique'trum**, *L.*; leaves linear sharply keeled sheathing the base of the triquetrous scape, heads lax-flowered, bulbils 0, spathes 2 lanceolate.

Hedgebanks and meadows, Guernsey; fl. April–June.—*Bulbs* ovoid, rather small. *Leaves* 5–7 in., ¼–⅓ in. broad, recurved or revolute. *Scapes* 10–18 in., rather stout, bending over in fruit. *Flowers* secund, drooping or inclined; perianth ⅔ in., white, campanulate; segments linear-oblong; pedicels curved, clavate at the tip. *Stamens* short, free, included, filaments slender. *Stigmas* 3, distinct, filiform.—DISTRIB. S. of France, Spain, Italy.

9. **A. ursi'num**, *L.*; leaves ovate-lanceolate sheathing the base of the 3-gonous scape, spathes 2 ovate acuminate. *Ramsons.*

oods, hedgebanks, &c. from Skye and Ross southwards; ascending to 1,200 ft. in Yorkshire; fl. April–June.—*Bulbs* narrow, compressed, on a short root-stock, outer coat fibrous. *Leaves* 4–8 in., vernal, acuminate; petioles 2–4 in. *Scape* 6–18 in. *Umbel* regular, flat-topped; spathes 1 in.; pedicels strict, 1½–2 in.; bulbils 0. *Perianth* white; segments spreading, lanceolate, acute. *Stamens* on the base of and shorter than the segments, filaments free slender. *Stigma* minute. *Capsule* turbinate.—DISTRIB. Europe, N. Asia.

12. GA'GEA, *Salisb.*

Bulb coated; coats few coriaceous. *Leaves* radical, linear. *Scape* with leafy bracts. *Flowers* yellow, corymbose or umbellate; perianth-segments persistent, free, spreading from an erect base, nectary 0. *Stamens* on the base of the segments, filaments flattened subulate; anthers linear, basi-fixed. *Ovary* 3-gonous or 3-quetrous; style 3-gonous, stigma obtuse; cells many-ovuled. *Capsule* membranous, loculicidally 3-valved. *Seeds* many, subglobose, pendulous, raphe thick, testa soft yellow; embryo cylindric, radicle next the hilum.—DISTRIB. Europe, N. Asia; species 20.—ETYM. *Sir Thomas Gage*, a British botanist.

1. **G. lu'tea**, *Ker*; radical leaf solitary ribbed, sheath slender, bracts 1–3. *Yellow Star of Bethlehem.*

Copses and pastures on the E. from Perth and Moray to Dorset, local and rare; absent from Ireland; fl. March–May.—*Bulb* small, subglobose, with bulbils at the base. *Radical leaf* linear, 6–18 in., ⅛–¼ in. broad. *Scape* short; bracts 1–3, 2 sometimes opposite; pedicels 1–2 in. *Perianth* ½–¾ in., opens in forenoon only; segments linear-oblong, obtuse inner narrow west, yellow thin, green on the back.—DISTRIB. Europe. N. Asia, Himalaya.

13. LLOY'DIA, *Salisb.*

A small slender herb. *Bulb* minute, thickly scaly. *Leaves* filiform. *Stem* leafy, slender, 1–2-flowered. *Flowers* erect; perianth-segments per-

sistent, free, spreading, equal, yellow or white, with a transverse nectariferous cavity. *Stamens* 6, on the base of the segments, filaments filiform; anthers oblong, basifixed. *Ovary* 3-gonous; style filiform, stigma obtuse; cells many-ovuled. *Capsule* 3-quetrous, loculicidally 3-valved at the top. *Seeds* many, horizontal, 3-quetrous, testa black rugose; embryo minute, next the hilum.—DISTRIB. Switzerland, Austria, France, Caucasus, Siberia, Himalaya, N. America.—ETYM. *Edward Lloyd*, an antiquary of last century, who discovered it in Wales.

1. **L. serotí'na,** *Reich.*; leaves 3-gonous incurved.

Rocky ledges of the Snowdon range, very rare; fl. June.—*Sheaths* of bulb very many and loose. *Leaves* 6–10 in., cauline shorter. *Stem* 2–8 in., terete. *Perianth-segments* ½ in., white (in England), obovate-oblong, veined with purple. *Seeds* red-brown till quite ripe.—Flowers in the Himalaya vary from white to primrose-yellow or deeper.

14. FRITILLA'RIA, *L.*

Bulbs often clustered; scales few, thick. *Stem* leafy, 1- or more-flowered. *Leaves* sessile, not sheathing. *Flower* drooping; perianth campanulate; segments free, caducous, tips not recurved, nectariferous gland basal. *Stamens* on the very base of the segments, filaments subulate; anthers oblong or linear, fixed above the base in front. *Ovary* long, 3-gonous; style 3-grooved, stigmas 3-glandular on the inner surface; cells many-ovuled. *Capsule* erect, oblong, 3-gonous, loculicidally 3-valved above, margins of valves ciliate. *Seeds* many, 2-seriate, horizontal, vertically compressed, margined or winged, testa spongy pale; embryo terete, radicle next the hilum.—DISTRIB. N. temp. regions; species 30.—ETYM, *fritillus*, a *dice-box*, from the chequered petals.

1. **F. Melea'gris,** *L.*; leaves linear flat subacute. *Snake's Head.*

Moist meadows, rare, from Norfolk and Bedford to Sussex and Hants; a denizen, *Watson*; fl. May.—*Bulb* small, of 2–3 turgid scales. *Leaves* 6–8 in., ¼–½ in. broad, cauline few, short. *Stem* 10–18 in. *Flower* solitary, rarely 2, 1½ in., segments narrow-oblong, tesselated with dull purple, rarely almost colourless; nectary narrow. *Anthers* ½ in., yellow. *Seeds* close-packed.—DISTRIB. Europe to W. Asia.

14*. *TU'LIPA, L.*

Bulb of few thick convolute scales. *Leaves* radical and cauline, lower sheathing. *Flowers* usually solitary, erect or inclined; perianth campanulate, segments free, tips recurved, nectary 0. *Stamens* hypogynous, filaments short subulate glabrous or hairy below; anthers fixed by the base, mobile, linear, bursting inwards. *Ovary* 3-gonous; stigma sessile with 3 radiating lobes; cells many-ovuled. *Capsule* erect, coriaceous, and seeds as in *Fritillaria*.—DISTRIB. Europe, and N. and W. Asia; species 20.—ETYM. *Tulipan*, a *turban*, in Persian.

T. SYLVES'TRIS, *L.*; perianth-segments elliptic-lanceolate. *Wild Tulip.*

Chalk pits, &c. possibly wild in Norfolk and Suffolk; naturalized in pastures and copses elsewhere; fl. April–May.—*Bulb* small, ovoid, stoloniferous; scales chesnut-brown. *Leaves* few, 6–10 in., linear, ½–1 in. broad, glaucous.

Stem 1–2 ft., terete, flexuous. *Flowers* 2 in., fragrant, bright yellow; segments elliptic-lanceolate. *Filaments* woolly at the base. *Capsule* 1 in., acute above and below.—DISTRIB. Europe.

14**. *LIL'IUM*, *L.*

Bulb of many imbricate fleshy scales. *Leaves* all cauline, not sheathing, alternate or whorled. *Flowers* few or many, large, solitary, erect or drooping; perianth-segments free, caducous, erect below, recurved or revolute above; nectary median, elongate. *Stamens* hypogynous or on the base of the segments, filaments subulate; anthers fixed above the base in front, versatile, bursting inwards. *Ovary* 6-grooved; style terete, stigma obtuse; cells many-ovuled. *Capsule* erect and seeds as in *Fritillaria*.—DISTRIB. Temp. N. regions; species 40.—ETYM. Unknown.

L. MAR'TAGON, *L.*; leaves petioled obovate-lanceolate whorled, upper linear, flowers erect racemose. *Purple Martagon Lily.*

Copses, naturalized near Mickleham, Surrey; fl. Aug.–Sept.—*Bulb* large, scales white. *Stem* 2–3 ft., terete. *Leaves* 3–8 in., chiefly in a few whorls of 6–8, subacute. *Flowers* 1½ in. diam., drooping; bracts ½–1 in., green, linear-lanceolate; pedicels 1–5 in., stout, curved; perianth-segments oblong, revolute beyond the middle, pale purple or white, with dark raised papillæ; nectary with thick raised borders. *Anthers* red-brown. *Capsule* 1 in.—DISTRIB. Europe from Mid. France southwards and eastwards.

15. COL'CHICUM, *L.* MEADOW SAFFRON.

Corm coated. *Leaves* all radical, usually vernal. *Bracts* spathaceous. *Flowers* autumnal, solitary or fascicled, subsessile on the top of the corm, erect, crocus-like; perianth-tube very long, slender, limb campanulate; segments 6, oblong, in 2 series. *Stamens* on the mouth of the perianth, included, filaments filiform; anthers oblong, fixed above the base in front, bursting inwards, afterwards resupinate. *Ovary* deeply 3-grooved; styles 3, wholly free, filiform, tips recurved, stigmas decurrent on their inner faces; cells few- or many-ovuled. *Capsule* membranous, 3-grooved to the axis, septicidally 3-valved at the top. *Seeds* subglobose, testa rugose, funicle fleshy; embryo minute, excentric, remote from the hilum.—DISTRIB. Europe, N. and E. Asia; species 20.—ETYM. Classical.

1. **C. autumna'le**, *L.*; leaves lanceolate, sheaths stout long large.

Meadows, from Westmoreland and Durham to Dorset and Surrey, rare and local, naturalized in Scotland; S. and Mid. Ireland; fl. Aug.–Oct.—*Corm* large, oblique, compressed; scales shining, chesnut. *Leaves* flat, 6–10 in., nerves close-set. *Flowers* appearing in succession; ovary subterranean; perianth-tube 2–6 in.; limb 1½ in., pale purple. *Anthers* ½ in., yellow. *Capsule* 1–2½ in., shortly peduncled, ellipsoid, acute at both ends. *Seeds* many, small, pale brown.—DISTRIB. Europe from Denmark southwards.—Yields the famous drug. Flowers when vernal greenish and imperfect.

16. TOFIEL'DIA, *Hudson.*

Rootstock shortly creeping. *Leaves* radical, equitant, ensiform. *Scape* slender. *Flowers* racemed, small, green; bracteoles 3, minute connate;

perianth-segments persistent, spreading, free. *Stamens* 6, on the base of the segments, filaments filiform; anthers short, fixed by the back, dehiscence inwards. *Ovary* ovoid, 3-gonous; styles 3, conic, persistent, stigmas obtuse; cells many-ovuled. *Follicles* 3, almost free, membranous, oblong, acute. *Seeds* many, minute, marginal on the valves, cymbiform, testa thin, sometimes produced at each end; embryo minute, next the hilum.—DISTRIB. Alps of Europe, temp. Asia and N. America; species 10.—ETYM. *Tofield*, a Yorkshire botanist.

1. **T. palus'tris,** *Huds.*; bracteoles scarious. *T. borealis*, Wahl.
Mountain rills and bogs, ascending to 2,400 ft. in the Highlands; Teesdale in England, absent from Ireland; fl. July–Aug.—*Leaves* tufted, 2–3 in., 3–5-nerved. *Scape* 4–8 in., naked or 1–2-leaved, slender, terete. *Raceme* dense-flowered, ½–1 in.; pedicels short, bracteolate at the base. *Flowers* ¼ in. diam., pale-green; segments linear-oblong, obtuse. *Capsule* ¼ in. diam., subglobose.—DISTRIB. Arctic and Alpine Europe, Asia, N. America.

17. NARTHE'CIUM, *Hudson.* BOG ASPHODEL.

A rigid herb with the habit and leaves of *Tofieldia*. *Flowers* racemose, golden-yellow, pedicel 1-bracteate; perianth-segments subequal, spreading, persistent, erect in fruit. *Stamens* 6, hypogynous, 3 on the base of the segments, filaments subulate, villous; anthers linear, fixed by the back, bursting inwards. *Ovary* narrow-ovoid, 3-gonous, narrowed into the short style, stigma obtuse; cells many-ovuled. *Capsule* 3-gonous, narrow, pointed, loculicidally 3-valved above. *Seeds* many, narrow-oblong, terete, membranous, testa filiform at each end, attached to the inner basal axis of the cell by a hair-like pedicel; embryo most minute, next the hilum.—DISTRIB. Europe N. of the Alps and Pyrenees, N. Asia, N. America.—ETYM. *ναρθήκιον*, a *rod*.

1. **N. ossif'ragum,** *Huds.*; perianth-segments linear-oblong.
Bogs, ascending to near 3,200 ft. in the Highlands; fl. July–Aug.—*Rootstock* wiry, long, slender. *Leaves* 6–12 in., rigid, strongly ribbed, acuminate. *Stem* leafless or with 1–2 short ½-amplexicaul leaves. *Raceme* 2–4 in.; bracts subulate; pedicels sometimes bracteolate. *Flowers* ½ in. diam.; segments linear-oblong, ribbed and green on the back. *Filaments* white; anthers deep-orange. *Capsule* red, longer than the perianth.

ORDER IX. **JUN'CEÆ.**

Perennial, rarely annual herbs. *Rootstock* usually creeping, scaly. *Stems* erect, usually simple, sometimes septate within, pith often thick, continuous or interrupted. *Leaves* slender, flat, or like the stem, or reduced to sheathing scales. *Flowers* green or brown, in axillary or terminal cymes, regular, 2-sexual, bracteolate. Perianth inferior, scarious or coriaceous; segments 6 in 2 series, free, subequal, persistent, imbricate in bud. *Stamens* 6, inserted on the bases of the segments, rarely 3 on the outer only, filaments flattened; anthers basifixed, usually linear, bursting inwards. *Ovary* free, of 3 connate carpels, 1–3-celled; style short or 0,

stigmas 3 filiform papillose all over; ovules 3 basilar, or many on 3 parietal or axile placentas, erect, anatropous. *Capsule* 1–3-celled, loculicidally 3-valved, 3–many-seeded. *Seeds* erect, testa membranous often lax at one or both ends, albumen dense; embryo next the hilum, usually small.—DISTRIB. Chiefly temp. and Arctic; genera 4–5, species about 130.—AFFINITIES. With *Liliaceæ*.—PROPERTIES unimportant.

Glabrous. Ovules many, parietal or axile.....1. Juncus.
More or less pilose. Ovules 3, basal.....2. Luzula.

1. JUN'CUS, *L.* RUSH.

Glabrous herbs. *Outer perianth-segments* keeled or midrib thickened. *Stamens* 6, rarely 3. *Ovary* 3-rarely 1-celled; ovules many, placentas axile, rarely parietal. *Capsule* completely or incompletely 3-celled. *Seeds* many; embryo minute.—DISTRIB. Of the Order; species 100.—ETYM. *jungo*, from their use in *tying*.

SECTION 1. *Rootstock* perennial, usually creeping. *Stems* not septate within (nor appearing as if jointed when dry), terete, rarely compressed.

* *Leaves all reduced to sheaths. Cymes wholly lateral, many-flowered; flowers not clustered. Testa not produced at either end.*

1. J. commu'nis, *Meyer;* stems soft, pith continuous, perianth-segments lanceolate exceeding the obovoid retuse capsule, stamens 3.

Moist places; ascends to 2,400 ft. in the Highlands; fl. July–Aug.—*Tufts* circular, densely matted. *Stems* 1–3 ft., sometimes ¼ in. diam., green, very finely striate. *Cymes* very compound, variable in form and size. *Perianth* ⅛–¼ in. *Stamens* rarely 6. *Seeds* minute, yellow-brown.—DISTRIB. Europe, N. Africa, temp. Asia and America.

VAR. 1, *effu'sus*, L. (sp.); cymes usually lax effuse, perianth olive-green, anthers oblong, capsule not mucronate.—VAR. 2, *conglom'eratus*, L. (sp.); cymes usually dense subglobose, perianth tinged with brown, anthers longer linear, capsule mucronate.

2. J. glau'cus, *Ehr.*; stems rigid glaucous striate, pith interrupted, perianth-segments narrow-lanceolate about equalling the ovoid mucronate capsule, stamens 6.

Wet, usually stiff soils, from Aberdeen and Lanark southwards, and in Ireland; ascends to 1,200 ft. in N. England; fl. July–Aug.—Habit of *J. communis*, but not so tall, and stems deeply grooved. *Cymes* effuse, suberect. *Perianth* brown.—DISTRIB. Europe, N. Africa, Siberia.

Sub-sp. ? DIFFU'SUS, *Hoppe* (sp.); stems softer less glaucous and striate, pith continuous, cyme elongate, capsule more obovoid mucronate, seeds always imperfect.—Wet pastures, not common, very rare in Scotland and Ireland. A doubtful plant; perhaps a hybrid between *J. glaucus* and *effusus*.

3. J. bal'ticus, *Willd.*; stems rigid, pith continuous, perianth-segments ovate-lanceolate about equalling the ovoid abruptly mucronate capsule, stamens 3. *J. arcticus*, Hook. not Willd.

Sandy sea-shores, rarely by inland lakes, from Forfar and Kincardine northwards; fl. July.—*Rootstock* creeping, not tufted. *Stems* few, 1–2 ft., ⅛–⅛ in. diam., pale green, scarcely striate. *Cymes* small, corymbose, suberect, few-flowered. *Perianth* about ⅛ in., dark brown, midrib pale. *Anthers*

much longer than the filaments.—DISTRIB. Shores of the Baltic and Scandinavia to the Arctic circle, N. America.

4. **J. filifor'mis,** *L.*; stems wiry pale green filiform, pith interrupted, cyme midway up the stem small, perianth-segments lanceolate exceeding the turbinate obtuse mucronate capsule, stamens 6.

Stony and gravelly margins of lakes in the N. of England and Kincardine; absent from Ireland; fl. July–Aug.—*Rootstock* loosely tufted. *Stems* 4–8 in., very slender, faintly striate. *Sheaths* often with subulate tips. *Cyme* sessile; flowers few, crowded, very pale. *Anthers* shorter than the filaments. *Seeds* very minute.—DISTRIB. Europe (Arctic), N. Asia, N. America.

** *Leaves all reduced to sheaths, or a few elongate and stem-like. Cymes lateral, flowers clustered. Stamens* 6. *Testa produced at each end.*

5. **J. acu'tus,** *L.*; stem rigid pungent, sheaths long shining, perianth-segments ovate-lanceolate, inner obtuse with a broad scarious margin half as long as the broadly ovoid mucronate capsule.

Sandy sea-shores from Norfolk and Carnarvon southwards, rare; S. and S.E. of Ireland; fl. July–Aug.—*Tufts* circular. *Stems* 2–4 ft., stout, terete, hardly striate, many flowerless. *Cyme* corymbose, dense-flowered, very large in fruit; bracts lanceolate-subulate, exceeding the flowers; flowers ⅛–¼ in. *Perianth* brown, inner segments retuse winged towards the tip. *Capsule* nearly ¼ in., turgid, hardly 3-gonous.—DISTRIB. Shores of Europe from France southwards, N. Africa.

6. **J. marit'imus,** *Sm.*; stem wiry pungent, sheaths short pale, perianth-segments lanceolate all acute and without scarious margins equalling the elliptic-oblong acuminate capsule.

Salt marshes from Isla and Nairn southwards; rare in Scotland; common in Ireland; fl. July–Aug.—Habit of *J. acutus*, but irregularly tufted; stems less rigid and usually more slender; cyme more interrupted, branches long erect; bracts not exceeding the very pale flowers.—DISTRIB. Europe from Gothland southwards, N. Africa, W. Siberia, N. America.

*** *Leaves all terete compressed or channelled. Cymes terminal or lateral, 1–3 (rarely 6-) flowered. Testa produced at each end.*

7. **J. triglu'mis,** *L.*; stems terete, leaves radical subulate channelled, flowers usually 3 terminal equalling, the membranous bract, perianth-segments obtuse much shorter than the ellipsoid beaked capsule.

Alpine bogs, from Carnarvon and Durham northwards, ascending to 3,000 ft. in the Highlands; absent from Ireland; fl. July–Aug.—Tufted, black; stolons 0. *Stems* 6–18 in., slender, wiry. *Leaves* very short, formed of 2 septate tubes, sheaths auricled. *Flowers* erect, ⅛–¼ in., pale, red-brown in fruit.—DISTRIB. Arctic and Alpine Europe, N. Asia, Himalaya, N. America.

8. **J. biglu'mis,** *L.*; stems ½-terete, leaves radical subulate compressed, flowers usually 2 shorter than the bract, perianth-segments obtuse nearly equalling the turbinate retuse 3-lobed capsule.

Bogs on the Alps of Perth and Aberdeen, at 2,000–3,300 ft.; fl. July–Aug.—Not tufted, stoloniferous. *Stem* 2–6 in. *Leaves* shorter, septate within, sheaths not auricled. *Flowers* ⅛ in., upper pedicelled, lower sessile, chesnut-brown. *Capsule* mucronate between the lobes.—DISTRIB. Alpine and Arctic N. Europe, Asia, Himalaya, and N. America.

9. **J. casta'neus,** *L.*; stems terete leafy, leaves ½-terete fistular, cymes 1–3 lateral and terminal 2–6-flowered, perianth-segments acute half as long as the elliptic-oblong beaked capsule.

Alpine bogs, very rare; Argyle, Perth, Forfar, Aberdeen, alt. 2,500–3,000 ft.; fl. July–Aug.—Not tufted, stoloniferous. *Stem* 6–16 in. *Leaves* 2–3, variable in length, channelled above, sheaths not auricled, walls thin. *Flowers* ⅛–¼ in., bright brown. *Capsule* nearly ¼ in., 3-gonous. *Seeds* large for the genus.—DISTRIB. Arctic and Alpine, N. and Mid. Europe, and N. America, Siberia, Dahuria, Himalaya.

10. **J. trif'idus,** *L.*; stems wiry terete, leaves subulate short mostly reduced to sheaths, flowers 1–3 between 2 filiform bracts, perianth-segments acuminate shorter than the ovoid beaked capsule.

Alpine rocks, from Dumbarton, Perth, and Forfar northwards; alt. 1,200–3,000 ft.; fl. July–Aug.—Forms dense matted rigid masses of rootstocks and sheaths. *Stems* 3–10 in. *Upper leaf-sheath* with one short subulate leaf; another leaf occurs on the stem beneath the inflorescence, with a tubular sheath, which has often scarious edges. *Bracts* 2–4 in., filiform. *Flowers* ⅛ in., pale brown; perianth-segments very narrow, margins pale. *Style* and stigmas long. *Seeds* large, appendages short.—DISTRIB. Arctic and Alpine Mid. Europe and N. America, Siberia, W. Asia to Persia.

**** *Leaves chiefly radical, flat or grooved above. Cymes terminal, 3-many-flowered. Testa not produced at either end.*

11. **J. squarro'sus,** *L.*; rigid, stem compressed, leaves subulate ½-terete below channelled above, cymes terminal branched, clusters 2–3-flowered, perianth-segments oblong obtuse equalling the obtuse mucronate capsule.

Moorlands, ascending to 3,200 ft. in the Highlands; fl. June–July.—*Stems* densely tufted, 4–10 in., stout, solid, naked or with 1–2 leaves. *Leaves* 2–7 in., most densely crowded, gradually recurved from the broad keeled sheath, striate. *Cyme* irregularly corymbose, branches erect; bracts broad, scarious, shorter than the flowers. *Flowers* ⅛ in., pale. *Capsule* obtusely 3-gonous.—DISTRIB. Europe, Siberia, Greenland.

12. **J. compres'sus,** *Jacq.*; slender, stem 1–2-leaved subcompressed, leaves slender ½-terete channelled above, cyme terminal branched, flowers subsolitary, perianth-segments oblong obtuse equalling or shorter than the ovoid obtuse mucronate capsule. *J. bulbosus,* L. (name given by error).

Marshy places; fl. June–July.—*Rootstock* creeping. *Stems* 6–24 in., tufted, very slender, hollow. *Leaves* narrow, flaccid, suberect, equalling the stem or shorter. *Cyme* irregularly corymbose; branches suberect, slender, few-flowered; bracts small. *Flowers* ⅛–¼ in.; perianth-segments pale in the middle, with broad scarious pale or dark brown or purple margins.—DISTRIB. Europe, Siberia, Dahuria, W. Asia to Persia, N. America.

Sub-sp. COMPRES'SUS proper; stems tufted, capsule broader almost obovoid shortly mucronate much longer than the perianth.—Rather rare.

Sub-sp. GERAR'DI, *Loisel.* (sp.); stems more remote, capsule narrower strongly mucronate not exceeding the perianth. *J. bottnicus,* Wahl.; *J. cænosus,* Bich.—Salt marshes. Also in N. U. States.

SECTION 2. Perennial, usually creeping. *Stems* jointed (hollow and septate) internally, joints rarely visible externally. *Testa* not produced.

13. **J. obtusiflo'rus,** *Ehr.*; stem tall and leaves (few) erect terete, cymes lateral or subterminal in very compound corymbs, branches zigzag, perianth-segments obtuse equalling the ovoid mucronate capsule.

Marshy places, from Wigton and Haddington southwards; very rare in Scotland and in S.E. Ireland; fl. July–Aug.—*Rootstock* widely creeping. *Stems* not tufted, 2–3 ft., usually stout, soft, hardly striate, sheathed at the base. *Leaves* 1–2, like the stem. *Flowers* ⅛ in., sessile in dense peduncled or sessile clusters of 3–8, pale; bracts small, obtuse, scarious.—DISTRIB. Europe from Gothland southwards, except Greece Turkey and Russia, N. Africa.

14. **J. articula'tus,** *L.*; stem slender and leaves slightly compressed, cyme lateral or subterminal compound corymbose, perianth-segments acuminate not exceeding the obovoid narrow acuminate capsule.

Bogs, especially in mountain districts; ascending to near 3,500 ft. in the Highlands; fl. June–Aug.—Very variable in habit, size, robustness, amount of foliage, and size and composition of the cyme; the following sub-species express its principal modifications.—DISTRIB. Europe, N. Africa, N. and W. Asia to the Himalaya.

Sub-sp. ARTICULA'TUS proper; tall, leaves very conspicuously jointed when dry, flowers in dense distant sessile or peduncled clusters of 3–12 dark chesnut, bracts acuminate ½–⅔ as long as the flower, perianth-segments equalling the narrow acuminate capsule. *J. acutiflorus,* Ehr.—Ascends to 1,200 ft. in the Lake District.

Sub-sp. SUPI'NUS, *Mœnch* (sp.); rootstock sometimes tuberous, stems terete 3–10 in. often floating with flaccid straggling branches, joints very obscure, leaves slender, cyme terminal, branches few long suberect, bracts scarious acute sometimes equalling the flower, perianth-segments acute equalling the ovoid obtuse mucronate capsule.—Ascends to 3,400 ft. in the Highlands.—VAR. 1, *uliginosus,* Sibth. (sp.); erect, stamens 3.—VAR. 2, *subverticillatus,* Wulf (sp.); decumbent or floating, stamens 3.—VAR. 3, *Kochii,* Bab.; stamens 6, filaments longer, capsule retuse. *J. nigritellus,* Koch, not Don. Devon and Galway.

Sub-sp. LAMPROCAR'PUS, *Ehr.*; stem slightly compressed stout or slender, and leaves evidently jointed when dry, cyme terminal, branches long suberect, perianth-segments shorter than the narrow beaked glossy capsule, inner obtuse, stamens 6.—Ascends to 2,400 ft. in the Highlands; also found in N. America.—Of *J. nigritellus,* Don, not Koch (of the Clova Mts.), referred to this by Syme, nothing satisfactory is known; garden specimens in Borrer's Herbarium from Forster (given to the latter by Don himself), have compressed stems, and seem the same as *lamprocarpus.*

SECTION 3. Annual. *Stem* hollow, jointed and septate within or not. *Testa* not produced.

15. **J. bufo'nius,** *L.*; tufted, very pale, stems slender jointed upper part or cyme dichotomously branched, perianth-segments subulate-lanceolate much longer than the obtuse mucronate capsule, stamens 6.

Moist places; ascends to near 2,000 ft. in the Lake District; fl. June–Aug.—Very variable, densely aggregated, from the seedlings growing in masses. *Stem* 1–8 in., erect or ascending. *Leaves* few, setaceous, channelled above,

not jointed, pale green, very narrow, sheaths short. *Cyme* occupying most of the stem; branches short or long, often flexuous; flowers ⅛–⅓ in., solitary and distant, or in clusters of 2–4; bracts small, scarious, obtuse. *Flowers* usually secund, pale green. *Perianth-segments* very unequal, long-acuminate, sometimes much longer than the pale obovoid capsule.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, Himalaya, N. America.

16. **J. capita'tus,** *Weigel;* tufted, stems setaceous grooved not jointed, heads terminal bracteate, perianth-segments elliptic-ovate acuminate awned longer than the broadly ovoid mucronate capsule, stamens 3.

Sands inundated in winter, Jersey and Guernsey; fl. May–July.—Very small, 1–4 in., tufted, reddish when dry. *Stems* strict, leafless above. *Leaves* all radical, short, setaceous, channelled; sheaths short. *Heads* solitary, rarely 2–3, 3–6-flowered; outer bracts setaceous, about twice as long as the flowers, inner smaller, broadly ovate, aristate. *Perianth* ⅛ in., pale, tips recurved. —DISTRIB. Europe, N. Africa.

2. LU'ZULA, *DC.* WOOD-RUSH.

Characters of *Juncus*, but always perennial, foliage more grass-like, always more or less ciliate with long flexuous white hairs. *Anthers* usually longer than the filaments. *Ovary* 1-celled; ovules 3, subbasal, erect. *Capsule* 1-celled, 3-valved, 3-seeded. *Seed* with a basal or terminal appendage.—DISTRIB. All temp. and cold regions; species about 40.—ETYM. *luciola*, a *glowworm*.

1. **L. sylvat'ica,** *Bich.*; tall, cyme very compound, flowers clustered, perianth-segments awned hardly equalling the ovoid acute beaked capsule, seed tuberculed at the tip.

Woods and heaths, especially uplands; ascending to 2,300 ft. in the Highlands; fl. May–June.—*Rootstock* short, tufted; stolons short. *Stems* few, 1–2 ft. *Leaves*, radical ½–1 ft., often ¼ in. broad, with scanty silky hairs, channelled; cauline few, short. *Cyme* large, branches often 3–4 in., spreading in fruit. *Flowers* ⅛ in., pale, usually 3–4 together; bracteoles ovate, acute, scarious.—DISTRIB. Europe (Arctic), excl. Russia.

2. **L. pilo'sa,** *Willd.*; slender, cyme lax, branches few reflexed in fruit, flowers subsolitary, perianth-segments acuminate shorter than the very broadly ovoid obtuse capsule, crest of seeds long curved terminal.

Shady places, ascending to near 1,900 ft. in the Highlands; fl. April–May.—*Rootstock* short, tufted; stolons slender. *Stems* many, ½–1 ft. *Leaves* about half as long as the stem, ⅛–¼ in. broad, soft, sparingly hairy. *Cyme* with capillary branches and pedicels. *Flowers* ⅛–⅓ in., chesnut-brown, rarely in pairs; bracteoles broad, short. *Capsule* very broad below, suddenly contracted to a conical top above the middle.—DISTRIB. Europe (Arctic), N. Africa, temp. Asia, N. America.—*L. Borre'ri*, Bromf., is a form chiefly found in S. England and Wicklow, with an acute shorter capsule that ripens no seed.

3. **L. Forste'ri,** *DC.*; characters of *L. pilosa*, but more slender, capsule acuminate, and seeds with a shorter terminal straight obtuse crest.

Shaded places in chalky soil, from Essex and Cardigan southwards; fl. April–June.—Habit of *L. pilosa*, from which luxuriant specimens can hardly be distinguished, except by the characters given above.—DISTRIB. France, Spain, Germany, Italy, Turkey, N. Africa.

4. **L. campes'tris**, *Willd.*; leaves very hairy, cyme short, flowers in dense clusters, perianth-segments acuminate longer than the broad obovoid obtuse apiculate capsule, seeds with a conical white basal appendage.

Heaths, meadows and pastures; ascending to 3,200 ft. in the Highlands and Wales; fl. April–June.—*Rootstock* creeping, tufted. *Stems* 4–12 in., stout or slender. *Leaves* shorter than the stem, usually copiously hairy. *Cymes* very variable; clusters of flowers subsessile, or on long drooping branches. *Flowers* ⅛ in., pale or dark; bracteoles ciliate. *Seeds* with no terminal crest.—DISTRIB. All temp. and cold regions.

VAR. 1, *campes'tris* proper; usually short, clusters usually 3–4-flowered, seeds subglobose.—VAR. 2, *congesta*, Sm. (sp.); larger, stouter, cymes more contracted, flowers more in a cluster, perianth-segments narrower, filaments longer, capsule narrow, seeds oblong with a shorter basal appendage. *L. multiflora*, Lej.; *sudetica*, DC. Most frequent on heaths.

5. **L. spicata**, *DC.*; leaves slender, cyme drooping dense-flowered spike-like, bracteoles silvery, perianth-segments awned exceeding the broad ellipsoid apiculate capsule, seeds with an obscure white basal appendage.

Mts. of Wales, Westmoreland, and Scotland, from 1,000 to 4,300 ft.; absent from Ireland; fl. July.—*Rootstock* densely tufted; stolons short. *Stems* 6–12 in., slender. *Leaves* much shorter than the stem, small, hairy on the sheaths chiefly, coriaceous, recurved, narrow, channelled; cauline few, short. *Cymes* ¾–1½ in., shorter than the leafy bracts. *Flowers* ⅛ in., usually shorter than the scarious transparent ciliate awned bracteoles. *Seeds* oblong.—DISTRIB. Arctic and Alpine Europe, N. Asia, Himalaya, N. America.

6. **L. arcua'ta**, *Hook.*; dwarf, leaves short, cyme umbelled, branches few outer slender recurved, perianth-segments acuminate exceeding the broadly ovoid apiculate capsule, seeds with an obscure basal appendage.

High alps of Aberdeen, Banff, and Sutherland, from 3,000 to 4,300 ft.; fl. July.—*Rootstock* creeping, loosely tufted; stolons slender. *Stem* 1–4 in., rather stout. *Leaves* coriaceous, sparingly hairy, narrow, recurved, channelled. *Cyme* lax, outer branches 1–2 in., 1–3-flowered. *Flowers* ⅛ in., 3–5 in a cluster, dark chesnut; bracteoles lanceolate, acute, not silvery. *Seeds* small, oblong.—DISTRIB. Mts. of Scandinavia, Arctic regions.

ORDER X. AROI'DEÆ.

Herbs with creeping or tuberous rootstocks. *Leaves* various. *Spathe* 1-leaved. *Flowers* on a spadix, 1- or 2-sexual; perianth 0, or hypogynous and polyphyllous. *Stamens* few or many, filaments short free or 0; anthers 2-celled, dehiscing outwards, or by terminal pores. *Ovary* 1- or more-celled; style simple or 0, stigma capitate or discoid; ovules 1 or more, variously attached. *Berry* 1- or more-celled. *Seeds* 1 or more, testa thick, albumen abundant fleshy or mealy, rarely 0; embryo various.—DISTRIB. Trop. and temp. regions; genera 100; species 1,000.—AFFINITIES. With *Pandaneæ* and *Typhaceæ*.—PROPERTIES. Acrid and poisonous.

SUB-ORDER 1. **AROI'DEÆ** proper. Flowers 1-sexual; perianth 0...1. Arum.
SUB-ORDER 2. **ORONTIA'CEÆ**. Flowers 2-sexual; sepals free...2. Acorus.

1. AR'UM, *L.* CUCKOO-PINT, LORDS AND LADIES.

Rootstock tuberous. *Leaves* radical, nerves reticulate; petioles sheathing at the base. *Scape* terete. *Spathe* convolute, contracted above the base. *Spadix* contracted below the middle, terminated by a naked cylindric column, bearing from the base upwards, 1stly a crowd of naked sessile ovaries; 2dly rudimentary ovaries; 3dly a crowd of naked sessile anthers; 4tily staminodes. *Anthers* adnate, 2–4-celled, dehiscence terminal. *Ovaries* 1-celled; stigma sessile; ovules few, basal, erect, orthotropous. *Berry* fleshy. *Seeds* few, testa coriaceous thickened at the hilum, albumen mealy; embryo short, radicle opposite the hilum. —DISTRIB. N. temp. and sub-trop. regions; species about 40.—ETYM. Doubtful.

1. **A. macula'tum,** *L.*; leaves vernal, petiole as long as the blade, basal lobes ⅓ as long as the midrib, spathe twice as long as the spadix.

Woods and hedges, from Berwick and Roxburgh southwards; ascending to 1,000 ft. in the N. of England; doubtfully wild in Scotland; all Ireland; fl. April–May.—*Corms* annual, new produced at the base of the stem. *Leaves* 6–10 in., 2–4, hastate-cordate, often spotted black, lobes acute or obtuse. *Scape* short, lengthened in fruit. *Spathe* 6–10 in., erect, yellow-green, edged and often spotted with purple, base persistent. *Spadix* above dull purple, rarely yellow. *Berries* ½ in. diam., crowded, scarlet, bursting the base of the spathe. *Seeds* 2–3, testa reticulate.—DISTRIB. Europe from Gothland southwards, N. Africa.—Corms yield Portland arrow-root.

2. **A. ital'icum,** *Miller;* leaves hibernal, petiole longer than the blade, basal lobe ½ as long as the midrib, spathe thrice as long as the spadix.

I. of Wight; fl. July–Aug.—A larger, stouter plant than *A. maculatum*, well described by Syme, who observes that the leaves are more triangular; the spathe falls over at the top as soon as it expands; the pistillidia are much longer; the spadix always yellow; berries longer, and seeds larger.—DISTRIB. Europe, excl. Russia, from Holland southwards, N. Africa.

2. A'CORUS, *L.* SWEET-FLAG.

Rootstock creeping. *Leaves* radical, ensiform, equitant. *Scape* flattened. *Spathe* continuous with the scape, 2-edged. *Spadix* lateral, terete, narrowed upwards, covered with 2-sexual flowers. *Perianth-segments* 6, free, membranous, oblong, persistent. *Stamens* 6, on the base of the segments, filaments flattened; anthers didymous. *Ovary* 2–3-celled; stigma sessile minute; ovules many, pendulous from the top of the cell, orthotropous. *Berry* 6-gonous, full of mucus. *Seeds* 1–3, testa thin, albumen horny; embryo green, cylindric, radicle next the hilum.—DISTRIB. Europe, temp. Asia; species 2–3.—ETYM. Classical.

1. **A. Cal'amus,** *L.*; midrib of leaf thick.

Sides of ditches, ponds, &c. from York and Lancaster southwards, rare; naturalized in Scotland and Ireland; fl. June–July. *Leaves* 3–6 ft., ⅔–1¼ in. diam., margins waved. *Scape* leaf-like, ⅓ in. diam. *Spathe* long. *Spadix* 3–4 in., ⅔ in. thick, curved. *Perianth-segments* not longer than the ovary. *Fruit* obovoid, top pyramidal.—DISTRIB. Europe, Siberia, Dahuria, Himalaya, N. America.—Aromatic, stimulant, tonic. I have never seen fruit.

ORDER XI. LEMNA'CEÆ.

Minute floating solitary or fascicled green fronds, rootless or with capillary simple roots, propagated by budding from marginal clefts, and by autumnal hybernating bulbils, rarely by seed; vascular tissue 0 or rudimentary; roots tipped by a membranous sheath. *Flowers* rarely produced, most minute, 1–3 in a spathe. *Perianth* 0. *Stamens* 1–2; anthers 1–2-celled, dehiscence transverse; pollen spherical. *Ovary* 1-celled; style short, stigma truncate or funnel-shaped; ovules 1–7, orthotropous anatropous or ½-anatropous. *Utricle* bottle-shaped. *Seeds* 1 or more, testa coriaceous, inner coat thickened and discoid over the radicle, albumen fleshy or 0; embryo axile, straight, stout, cylindric.—DISTRIB. All standing waters; genera 6; species about 20.—AFFINITIES. With *Pistiaceæ*, *Naiadeæ*, and *Aroideæ*.—PROPERTIES 0.

Frond with 1 or more capillary roots.....1. Lemna.
Frond rootless.....2. Wolffia.

1. LEM'NA, *L.* DUCKWEED.

Fronds with roots. *Flowers* in marginal clefts of the frond. *Stamens* 1–2, filaments slender; anthers 2-celled, didymous; pollen muricate. *Ovules* 1–7.—DISTRIB. All latitudes; species 12.—ETYM. The Greek name.

SUB-GEN. 1. **Lem'na** proper. *Root* single. *Ovule* 1, ½-anatropous. *Seed* horizontal; albumen copious.

1. **L. mi'nor,** *L.*; frond obovate or oblong slightly convex below.

Still waters; fl. July.—Annual. *Frond* ⅛–¼ in., young sessile on the old, soon disconnected, green above, paler beneath; epidermal cells with flexuous walls. *Spathe* unequally 2-lipped. *Stamens* 2, developed successively (each a male flower?), filaments slender. *Style* long.—DISTRIB. Almost ubiquitous.

2. **L. trisul'ca,** *L.*; frond flat obovate-lanceolate, tip serrate, young hastate persistent. *Ivy-leaved Duckweed.*

Still waters, from Fife and Forfar to Devon and Kent, but rare in Scotland; local in Ireland; fl. June–July.—*Frond* ½–¾ in., submerged, narrowed at the base, without epidermis, proliferous on one or both sides; young fronds, numerous placed crosswise to the old. *Style* very short. *Testa* rough, grooved.—DISTRIB. Europe, Siberia.

SUB-GEN. 2. **Telmatopha'ce,** *Schleiden* (gen.). *Root* single. *Ovules* 2–7, erect, anatropous. *Seeds* erect; albumen scanty or 0.

3. **L. gib'ba,** *L.*; frond obovate or orbicular tumid below, stamens 2, utricle bursting transversely.

Still waters, from Fife to Devon and Kent, E. of Scotland only; rare and local in Ireland; fl. June–Sept.—*Frond* ⅛–⅓ in., opaque, pale green, young sessile; cells beneath very large, epidermal with flexuous walls.—DISTRIB. Europe, Siberia, N. Africa, America.

SUB-GEN. 3. **Spirode'la,** *Schleiden* (gen.). *Roots* many. *Ovules* 2, erect, anatropous. *Fruit* unknown.

4. **L. polyrhi'za,** *L.*; frond broadly obovate plano-convex 7-nerved.

Ponds and ditches from Lanark and Edinburgh to Devon and Kent southwards;

rare and local (if native) in Scotland; Mid. Ireland, rare.—*Frond* ¼–½ in., dark green above, purple beneath, tracheæ abundant; epidermal cells with flexuous walls. *Spathe* 2-lipped. *Stamens* 2.—DISTRIB. Europe, Siberia, Madeira, N. America.—Flower unknown in Britain.

2. WOLFF'IA, *Horkel.*

Fronds like grains of sand, rootless, oblong or subglobose, flattened above, proliferous, cleft near the base. *Flowers* bursting through the upper surface of the fronds. *Spathe* 0. *Anther* sessile, 1-celled; pollen smooth. *Ovary* globose; style short, stigma depressed; ovule 1, erect, orthotropous. *Utricle* spherical, indehiscent. *Seed* obliqne; albumen fleshy, scanty.—DISTRIB. Europe local, W. trop. Africa.—ETYM. *J. F. Wolff*, a writer on *Lemna*.

1. **W. arrhi'za,** *Wimm.*; frond loosely cellular beneath.

Ponds, Essex, Middlesex, Hants, Surrey, probably common elsewhere.—The smallest known flowering plant. *Frond* ⅟₂₀ in. long, ⅟₅₀ in. broad, young solitary at the base of the old, soon detached; epidermal cells with straight walls. *Flowers* described from African specimens.

ORDER XII. TYPHA'CEÆ.

Marsh or aquatic herbs. *Rootstock* creeping. *Leaves* narrow, linear, obtuse, bases sheathing. *Spathe* 0. *Flowers* monœcious, in cylindric spikes or heads, the males uppermost. *Perianth* 0 or of membranous scales or hairs, imbricate, persistent.—MALE. *Stamens* few or many, filaments slender; anthers basifixed, oblong, 2-celled, dehiscence lateral.—FEMALE. *Ovary* sessile or stalked, 1- rarely 2-celled, contracted into a simple persistent style, stigmas unilateral decurrent papillose; ovule 1, pendulous from the top of the cell. *Fruit* small, coriaceous, or a drupe. *Seed* pendulous, albumen fleshy or mealy; embryo straight, terete, radicle next the hilum.—DISTRIB. Temp. and trop.; genera 2; species about 12.—AFFINITIES. With *Aroideæ* and *Pandaneæ* (screw-pines), of which *Sparganium* is almost a member.—PROPERTIES. The roots of *Typha* are farinaceous; and the pollen is made into cakes in Sind and New Zealand.

Flowers in globose heads ..... 1. Sparganium.
Flowers in cylindric spikes ..... 2. Typha.

1. SPARGA'NIUM, *L.* BUR-REED.

Heads globose, subtended by leafy bracts. *Perianth* of 3–6 spathulate membranous scales. *Stamens* 2–3, connective hardly produced at the tip. *Ovary* 1- rarely 2-celled. *Drupe* angled, small, 1–2-celled.—DISTRIB. Temp. and trop.; species about 10.—ETYM. *σπάργανον*, a *band*, from the form of the leaf.

1. **S. ramo'sum,** *Hudson;* erect, branched, leaves erect 3-quetrous at the base keeled, stigma linear, drupes sessile broadly ovoid, beak short.

Ponds, ditches, and river-banks; fl. June–July.—*Stem* 1–4 ft. *Leaves* 2–5 ft., 1 in. broad. *Male heads* olive-brown, deciduous, ½–¾ in. diam.; *female* as large, 1 in. when in fruit; bracts linear. *Drupe* ¼ in.—DISTRIB. Europe, Siberia, N. Africa, N. America.

2. **S. simplex,** *Hudson;* erect, simple, leaves erect (sometimes floating) keeled 3-gonous below, heads racemose, stigma linear, drupe shortly stalked fusiform, beak long.

Ponds, ditches, and river-banks, from Isla and Ross southwards; fl. June–July. —*Stem* 1–2 ft. *Male heads* yellow, sessile; female peduncled. *Drupe* narrowed at both ends.—DISTRIB. Europe, N. and W. Asia, N. America.

3. **S. natans,** *L.*; floating, simple, leaves flat at the base not keeled, heads racemose, stigma tongue-shaped, drupe stalked, beak rather long.

Lakes, ditches, &c. from Dorset and Kent northwards; ascends to near 1,600 ft. in the Highlands; fl. July–Aug.—*Stem* 1–3 ft., suberect in flower, leafy, flaccid, upper part floating. *Leaves* ¼–½ in. diam. *Heads* ½ in. diam., female peduncled.—DISTRIB. Europe, N. Africa, Siberia, W. Asia, N. America.—Probably a form of *S. simplex,* as suggested by Bentham.

VAR. 1, *affine,* Schn. (sp.); sheaths rather inflated, male heads several, drupe fusiform. Lakes in Wales, N. of England, Scotland, and Ireland.—VAR. 2, *minimum,* Fries (sp.); sheaths not inflated, male heads solitary, drupe more obovoid. Common.

2. TYPHA, *L.* REED-MACE, CAT'S-TAIL, BULRUSH.

Spikes superposed, cylindric, with occasional deciduous leafy bracts. *Perianth* of 2–3 extremely slender jointed silky scales. *Stamens* several, monadelphous; connective produced. *Ovaries* stalked, many imperfect; style very slender, stigma unilateral, narrow. *Fruit* minute, stalked, dehiscent along the inner face. *Seed* cylindric, testa striate.—DISTRIB. Temp. and trop.; species 6 or 8.—ETYM. τῖφος, a *fen.*

1. **T. latifolia,** *L.*; leaves ⅜–1¼ in. broad subglaucous, spikes contiguous or nearly so. *T. media,* DC.

Lakes, river-banks, &c. from Renfrew and Elgin southwards; fl. July–Aug.—*Stem* 3–7 ft., terete. *Leaves* distichous, 3–6 ft., linear, obtuse, nearly flat. *Spikes* ½ to nearly 1 ft., 1 in. diam., dark brown, silky from the copious filiform perianth scales. *Stigma* lanceolate.—DISTRIB. Europe, N. Africa, N. and W. Asia, N. America.

2. **T. angustifolia,** *L.*; leaves ¼–⅜ in. broad dark-green not glaucous convex beneath, spikes separate.

Ditches and ponds, from Fife and Kirkcudbright southwards; rare in Scotland; E. of Ireland, very rare; fl. July.—Smaller in all its parts than *T. latifolia;* leaves narrower, channelled towards the base; spikes ½–¾ in. diam., separated by ½–1 in., female often interrupted; perianth-scales dilated towards the tip; stigmas broader.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, India, N. America.

ORDER XIII. ERIOCAULONEÆ.

Perennial, scapigerous herbs, usually marsh or aquatic. *Leaves* chiefly radical, often cellular, sheaths narrow. *Flowers* minute, usually monœcious, in involucrate heads, 1-bracteolate.—MALE. *Perianth* membranous or scarious, outer of 2–3 free segments; inner a 2–3-lobed tube. *Stamens* 2–3, inserted on the tube opposite its lobes, with sometimes alternate perfect or imperfect ones, filaments inflexed in bud; anthers fixed by the back, 2-celled, bursting inwards. *Ovary* rudimentary.—FEMALE. *Peri-*

anth inferior, persistent, outer as in the male, inner of 2–3 petals or pencils of hairs. *Staminodes* 0. *Ovary* of 2–3 connate carpels; style short, terminal, persistent, stigmas 2–3 slender; ovule solitary, pendulous from near the top of each cell, orthotropous. *Capsule* membranous, 2–3-celled, loculicidally 2–3-valved. *Seed* pendulous; testa coriaceous, epidermis hyaline splitting into hairs, albumen floury; embryo outside and at the base of the albumen farthest from the hilum.—DISTRIB. Chiefly trop.; genera 5; species 300.—AFFINITIES. With *Restiaceæ* and *Xyridæ*.—PROPERTIES. Unimportant.

1. ERIOCAU'LON, *L.* PIPE-WORT.

MALE fl. chiefly in the centre of the head. *Outer perianth-segments* subspathulate. *Stamens* 4 or 6.—DISTRIB. Of the Order; species 50.—ETYM. ἔριον and καυλός, from the *woolly scapes* of some species.

1. **E. septangula're,** *With.*; leaves subulate, scape 6–8-furrowed.

Lakes in Skye, the Hebrides, and W. of Ireland from Connemara to Antrim; fl. Aug.—*Rootstock* creeping, branched; roots white, cellular. *Stem* very short, leafy. *Leaves* 2–4 in., compressed laterally, green, translucent, septate. *Scape* 6–24 in., rarely more, twisted. *Head* ¼–¾ in. diam.; bracts lead-coloured, oblong-obovate, obtuse. *Flowers* 2-merous; outer segments dark, bearded at the tip, inner ciliate with a black spot towards the tip. *Anthers* dark. *Ovary* stalked.—DISTRIB. N. America.

ORDER XIV. CYPERA'CEÆ.

Grassy or rush-like herbs, usually perennial. *Stems* solid, often 3-gonous. *Leaves* with closed sheaths. *Flowers* 1–2-sexual, in the axils of small bracts (glumes), which are arranged in terete angled or compressed spikelets, beyond which the stamens and pistils project. *Glumes* concave, often rigid, distichous or inserted all round the rachis, persistent or deciduous, lower of each spikelet often empty. *Perianth* 0, or of 3–6 or more hypogynous scales or bristles. *Stamens* 1–6, hypogynous, filaments linear, flat; anthers basifixed, pendulous, linear, dehiscing inwards, 2-celled, often with a claw at the tip. *Ovary* 1-celled (in *Carex* enclosed in a coriaceous utricle (perigynium) formed of 1 folded or 2 connate bracteoles; style 1, stigmas 2–3 filiform papillose all over; ovule solitary, erect, anatropous. *Fruit* small, coriaceous, indehiscent, compressed or 3-gonous (in *Carex* enclosed in the perigynium). *Seed* erect, testa membranous, albumen floury; embryo minute, lenticular, at the base and outside of the albumen.—DISTRIB. All climates; genera about 110; species about 2,000.—AFFINITIES. With *Gramineæ*.—PROPERTIES. Unimportant.

TRIBE I. **SCIRPE'Æ.** *Spikelets* terete. *Glumes* all but the 1–2 lower flowering, persistent. *Flowers* 2-sexual. *Perianth* 0, or of bristles.

* *Bristles* 0, *or included within the glumes.*

Spikelets fascicled, usually lateral. Bristles 6.....1. Scirpus.
Spikelets fascicled, lateral, rarely 1 terminal. Bristles 0.....2. Isolepis.
Spikelet 1, terminal. Bristles 3–6.....3. Eleocharis.
Spikelets alternate or spiked. Bristles 3–6.....4. Blysmus.

** *Bristles finally exserted far beyond the glumes*.....5. Eriophorum.

TRIBE II. **RHYNCHOSPO'REÆ.** *Spikelets* terete. *Glumes* 1–2 only flowering persistent. *Flowers* all or some only 2-sexual. *Perianth* 0 or of bristles.

Bristles 0. Pericarp corky.....6. Cladium.
Bristles 6–12. Fruit compressed.....7. Rhynchospora.

TRIBE III. **CYPE'REÆ.** *Spikelets* compressed. *Glumes* distichous, all or most flowering. *Flowers* 2-sexual. *Perianth* 0 or of bristles.

Spikelets 1–2-flowered. Glumes persistent. Bristles 3–5.....8. Schœnus.
Spikelets many-flowered. Glumes deciduous. Bristles 0.....9. Cyperus.

TRIBE IV. **CARICI'NEÆ.** *Spikelets* terete. *Glumes* many, all flowering. *Flowers* 1-sexual; male perianth 0.

Female fl. with a lateral scale.....10. Kobresia.
Female fl. enclosed in a perigynium.....11. Carex.

1. SCIR'PUS, *L.*

Leafy or leafless, usually tall, marsh- or water-plants; rootstock creeping. *Spikelets* several, in terminal or lateral cymes heads or clusters, terete. *Glumes* imbricate all round the rachis, often 2-fid, all or the 1–2 lowest only flowerless. *Flowers* 2-sexual. *Bristles* 6 or fewer, not exceeding the glumes. *Stamens* 3. *Style* 2–3-cleft, not swollen at the base, deciduous. *Fruit* compressed or 3-gonous, top not swollen.—DISTRIB. All climates; species about 50.—ETYM. The old Latin name.

* *Cymes leafless.*

1. **S. lacus'tris,** *L.*; stem terete or nearly so usually leafless, cymes terminal branched longer than the bracts, branches stout with solitary or clustered spikelets, glumes obtusely 2-lobed mucronate ciliate. *Bulrush.*

Lakes, ditches, and marshes; fl. July–Aug.—*Stems* 1–8 ft., spongy, as thick as the thumb or less at the base, sheathed. *Leaves* 0, or short flat and keeled in still water, or long and strap-shaped in streams. *Cyme* lateral at first, then expanding and overtopping the stem; branches few, ½–3 in., strict, stout. *Spikelets* 1–6, ¼–⅓ in., sessile, cylindric in flower, ovoid in fruit, red-brown. *Glumes* mucronate or awned. *Bristles* 4–6, shorter than the broad fruit.—DISTRIB. Arctic Europe, all temp. and many trop. regions.

Sub-sp. LACUS'TRIS proper; stem terete green, leaves often floating, glumes glabrous, anther-tips ciliate, fruit 3-gonous.

Sub-sp. TABERNÆMON'TANI, *Gmel.* (sp.); stem terete glaucous, floating leaves 0, glumes scabrid, anther-tips glabrous, fruit compressed. *S. glaucus*, Sm.—Usually near the sea, from Forfar and Isla southwards.

Sub-sp. CARINA'TUS, *Sm.* (sp.); stem green obtusely 3-gonous above, glumes smooth, anther-tips glabrous, fruit compressed.—Tidal rivers from Middlesex and Kent to Sussex.

2. **S. trique'ter,** *L.*; stem 3-quetrous usually leafless, cyme lateral, branches short stout, spikelets solitary or few elongate ovoid, glumes obtusely 2-lobed mucronate.

Muddy tidal banks of the Thames and Arun; fl. Oct.—*Rootstock* slender. *Stems* 1–3 ft., strict, spongy, concave on one side. *Leaves* 0, or very short on the upper sheath. *Spikelets* in sometimes sessile clusters. *Glumes* obovate, brown, smooth. *Anther-tip* glabrous. *Bristles* 2–6. *Fruit* obovoid, 3-gonous, smooth, shining.—DISTRIB. Europe from Denmark southwards.

3. **S. Roth'ii,** *Hoppe;* stem 3-quetrous, leaves 2–3 linear, spikelets lateral sessile, glumes ovate acutely 2-lobed mucronate. *S. pungens,* Vahl.

Sandy banks of St. Ouen's pond, Jersey; fl. June–July.—Habit of *S. triqueter,* but smaller, more slender, 6–18 in.; leaves 4–6 in., channelled, keeled; spikelets ½ in., sessile; glumes red-brown; anther-tips acute; bristles 1–2; fruit obovoid, pale.—DISTRIB. Europe from Denmark southwards.

** *Stem 3-gonous, leafy. Cyme terminal, leafy.*

4. **S. marit'imus,** *L.*; leaves channelled, cymes corymbose, spikelets few cylindric red-brown, glumes acutely 2-lobed awned.

Salt marshes from Ross and Skye southwards; fl. July–Aug.—*Rootstock* often tuberous. *Stems* 1–3 ft., tufted, rigid, leafy below. *Leaves* often ⅛ in. broad, elongate, keeled, dark green. *Spikelets* ½–1 in., brown, peduncled or sessile; bracts ½–1 ft.; glumes glabrous or pubescent. *Bristles* 1–6. *Fruit* compressed or 3-gonous, truncate, dotted, shining.—DISTRIB. Europe (Arctic), N. Africa, W. Siberia, N.W. India, N. America.

5. **S. sylvat'icus,** *L.*; leaves flat, cymes effuse, branches many divaricate, spikelets small ovoid green, glumes entire obtuse.

Moist shaded places, from Argyle and Banff southwards; fl. July.—*Stems* solitary, 1–3 ft., stout, leafy. *Leaves* large, sometimes ⅜ in. broad, keeled. *Cymes* 2–5 in. diam.; branches slender; spikelets ⅛–¼ in., 3–5 in a clustor. *Glumes* ribbed. *Bristles* 6, barbed. *Fruit* obovoid, mucronate, punctulate.—DISTRIB. Europe, Siberia, Dahuria, temp. N. America.

2. ISOLE'PIS, *Br.*

Usually small, perennial, slender, tufted green herbs. *Leaves* narrow or 0. *Spikelets* fascicled, lateral, small, terete, rarely solitary or terminal. *Glumes* many or few, entire, imbricate all round the rachis, the 1–2 lowest sometimes flowerless. *Bristles* 0. *Stamens* 1–3. *Style* simple at the base, deciduous, stigmas 2–3. *Fruit* compressed or 3-gonous, usually tumid at the top.—DISTRIB. Temp. climates, rare in trop.; species about 100.—ETYM. *Ἴσος* and *λεπίς,* from the *equal glumes.*

* 1. **I. seta'cea,** *Br.*; stems filiform, leaves 1–2 narrow channelled, spikelets 1–3 lateral, fruit obovoid 3-gonous ribbed and furrowed.

Gravelly and sandy damp places; ascending to 1,500 ft. in Yorkshire; fl. July–Aug.—*Stems* 3–6 in., tufted, terete, rigid. *Leaves* short, setaceous. *Spikelets* usually 2–3, ⅛–¼ in., ovoid. *Glumes* ovate, obtuse, green and brown. *Stamens* 2–3. *Stigmas* 3. *Fruit* broad, brown, finely striate between the ribs.—DISTRIB. Europe, N. Africa? Siberia.

2. **I. Sa'vii,** *Schultes;* stems filiform leaves 1–2 narrow channelled, spikelets 1–3 subterminal, fruit subglobose 3-gonous not furrowed.

Wet bogs from Isla southwards, chiefly in the West; fl. July.—Very similar to *I. setacea,* but larger, paler, often 10 in., with longer leaves; fruit paler, shining, dotted in lines.—DISTRIB. France, Spain, Italy, Turkey, N. Africa. Var. *β monostachys;* spikelet solitary. *I. pygmæa,* Kunth.

3. **I. fluitans,** *Br.*; floating, leafy, spikelet terminal solitary, fruit obovate compressed mucronate. *Eleogiton,* Link.

Marshes and pools, ascending to 1,200 ft. in Yorkshire; fl. June–July.—*Stem* 6–18 in., compressed, slender, branched. *Leaves* 1–2 in., linear, very slender.

Spikelets ⅛–¼ in., narrow-ovoid, pale. *Glumes* 4–8, oblong. *Stigmas* 2. *Fruit* plano-convex, pale, smooth, tipped with the base of the style.—DISTRIB. Europe from Gothland southwards, Azores.

4. **I. Holoschœ'nus,** *R.* and *S.*; stem tall terete stout, leaves few erect subulate rigid channelled, spikelets in compact globose cymose heads, fruit subglobose mucronate transversely wrinkled.

Sandy sea-coasts, N. Devon; fl. Sept.—*Rootstock* creeping, stout. *Stems* 2–3 ft., as thick as a crowquill, tufted at the base, margins of sheaths united by reticulate fibres. *Leaves* on the upper sheaths only, shorter than the stem, ½-terete, margins rough. *Heads* ½–¾ in. diam., upper subsessile; branches of cyme 1–3 in., ½-terete, very stout. *Spikelets* minute. *Glumes* obovate, notched, mucronate, ciliate. *Stigmas* 3.—DISTRIB. Europe from France and Spain southwards and eastwards, N. Africa, Siberia.—Habit of *Scirpus*.

3. ELEOCH'ARIS, *Br.*

Tufted, erect, usually perennial leafless glabrous herbs. *Stems* slender, sheathed at the base. *Spikelets* solitary, terminal, erect, terete angled or compressed. *Glumes* many, imbricate all round the rachis; lower 1–2, if any, flowerless. *Flowers* 2-sexual. *Bristles* 3–6, not longer than the glumes. *Stamens* 3. *Style* deciduous, articulate with the top of the fruit, stigmas 3. *Fruit* compressed or 3-gonous.—DISTRIB. All climates, especially temp.; species about 50.—ETYM. ἕλος and χαίρω, from *delighting* in *marshes*.

* *Fruit with a tumid top.*

1. **E. palus'tris,** *Br.*; rootstock stout creeping branched with many tufts of leaves and stems, lowest glume broadest, bristles 4–6, fruit compressed, stigmas 2.

Marshes, lake borders and ditches; ascending to 1,200 ft. in Yorkshire; fl. June–July.—*Rootstock* elongate, black. *Stems* 6–18 in., stout or slender, slightly compressed. *Sheaths* 2, brown, truncate, leafless. *Spike* ¼–½ in., terete, narrow-ovoid, red-brown. *Glumes* lanceolate, subacute; lowest much shortest, broadest, obtuse and embracing the base of the spike. *Fruit* compressed, obovate, striate, tumid, top triangular compressed.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, N. India, N. America.

VAR. 1, *palus'tris* proper; glumes dark, keel green, edges pale, lowest suborbicular half-embracing the base of the spikelet, fruit faintly striate.—VAR. 2, *uniglu'mis,* Link (sp.); glumes brown, edges narrow pale, lowest ovate almost embracing the base of the spikelet.—VAR. 3, *Watso'ni,* Bab. (sp.) short, more rigid, glumes dark brown, lowest embracing the base of the spikelet, fruit evidently punctate in lines.—Cantire and Lancashire.

2. **E. multicau'lis,** *Sm.*; rootstock short with one tuft of leaves and stems, lowest glume largest, bristles 5–6, fruit 3-gonous, stigmas 3.

Marshes, pools, &c., chiefly on moorlands; fl. July–Aug.—Similar to *E. palustris*, but differs in habit, in the obliquely truncate leaf-sheaths, and usually blunter glumes with narrower margins. *Fruit* hardly striate.—DISTRIB. Europe from Gothland southwards, excl. Turkey, N. Africa, N. America.

3. **E. acicula'ris,** *Sm.*; rootstock stoloniferous, stems setaceous obtusely 4-gonous grooved, spikelets minute compressed, glumes ovate obtuse, lowest broadest, bristles 1–3, fruit 3-gonous ribbed tumid, top subglobose.

Sandy edges of lakes and pools, from Perth and Kinross southwards, rare in Scotland and (W. only of) Ireland; fl. July–Aug.—*Stolons* capillary. *Stems* many, 2–8 in., extremely slender. *Sheaths* membranous, acute. *Spikelets* ⅛–¼ in., red-brown. *Fruit* very minute, pale.—DISTRIB. Europe (Arctic), Siberia, Daburia, N.W. India, N. America.

** *Spikelets few-flowered. Fruit beaked, top scarcely tumid.* (Bæotbryon, *Dietr.*)

4. **E. cæspito'sa,** *Link;* rootstock and leaves very short, 2 lowest glumes fertile equalling or exceeding the spike mucronate or awned, bristles 4–6 smooth, fruit obovoid 3-quetrous acuminate.

Heaths and moors, ascending to 3,500 ft.; fl. June–July.—*Stolons* 0. *Stems* 6–12 in., very densely tufted, wiry, grooved. *Sheaths,* lower split, large, stout, rigid, shining; upper slender, with an erect short subulate blade. *Spikelets* ⅛–⅓ in., erect, chesnut-brown, shining. *Glumes* few, rigid, lowest flowering with usually a long green point. *Anthers* long, exserted, mucro long. *Stigmas* 3, very long. *Fruit* brown.—DISTRIB. Europe (Arctic), Siberia, temp. and cold N. America.

5. **E. pauciflo'ra,** *Link;* rootstock creeping, stolons long, upper sheaths truncate, lowest glume fertile obtuse not equalling the spikelet, bristles 3–6 barbed, fruit obovoid 3-gonous.

Moorlands, north to Ross, ascending to 2,100 ft. in Yorkshire; fl. July–Aug. —Very similar to *S. cæspitosus,* but habit different, leafless, smaller; lowest glume obtuse, with the rib not produced to the top; and anthers not apiculate. *Fruit* pale, minutely striate; beak slightly contracted at the base, and quite the representative of the tumid top of the first division of the genus. —DISTRIB. Europe (Arctic), except Turkey, N. and W. Asia, N. America.

6. **E. par'vula,** *Hook.;* minute, rootstock creeping, sheaths hyaline, leaves setaceous, spikelet minute, glumes pale lowest flowerless obtuse not exceeding the spikelet, bristles 4–8 barbed, fruit obovoid 3-gonous.

Muddy sea-shores, Hampshire (probably extinct), Wicklow; fl. July.—*Rootstock* elongate, capillary, with distant tufts of a few soft stems and leaves, terminated by small tubers. *Stem* 1–2 in., grooved; sheath very inconspicuous, owing to its extreme tenuity. *Leaves* like the stems, slightly dilated at the base, recurved, subulate, channelled. *Spikelets* ⅛ in., pale. *Glumes* membranous, obtuse. *Fruit* pale.—DISTRIB. Europe from Gothland southwards, excl. Spain and Turkey.

4. BLYS'MUS, *Panzer.*

Erect, perennial, glabrous herbs. *Spikelets* distichous, in a lateral or terminal erect bracteate spike. *Glumes* imbricate all round the rachis, all but the 2 lowest flowering, oblong-lanceolate, obtuse. *Flowers* 2-sexual. *Bristles* 3–6. *Stamens* 3. *Style-base* not tumid, stigmas 2. *Fruit* plano-convex, beaked.—DISTRIB. Europe, Siberia, Himalaya; species 2.—ETYM. *βλυσμός,* a *spring.*

1. **B. compress'us,** *Panz.;* leaves flat, edges rough, lower glume ribbed much shorter than the spikelet.

Wet pastures and marshes, from Ayr and Haddington southwards; ascending to 1,500 ft. in Northumberland; absent from Ireland; fl. June–July.—*Rootstock* elongate. *Stems* 4–10 in., solitary, sheathed at the base. *Leaves* shorter than the stem, grass-like, keeled. *Bracts* leafy, long or short. *Spikes* ½–1½ in.

Spikelets many, ¼ in., pale brown. *Bristles* barbed. *Fruit* pale.—DISTRIB. Europe, excl. Spain Greece and Turkey, Siberia.

2. **B. ru'fus,** *Link;* leaves ½-terete smooth, lowest glume not ribbed equalling the spikelet.

Wet pastures, especially near the sea, from Anglesea and Durham northwards; N. half of Ireland; fl. July.—*Rootstock* creeping. *Stems* tufted, 3–12 in. *Leaves* short, channelled. *Spikes* ⅓–½ in., chesnut-brown. *Spikelets* few, short. *Bristles* short, rough, very deciduous. *Fruit* brown.—DISTRIB. Scandinavia (Arctic), N. Germany, Siberia, Dahuria, Himalaya.

5. ERIOPH'ORUM, *L.* COTTON-GRASS.

Perennial, tufted herbs. *Spikelets* terminal or lateral, solitary or cymose, terete. *Glumes* imbricate all round the rachis, all but 2–3 lowest flowering. *Flowers* 2-sexual. *Bristles* 4–6 or very many, capillary, flat, at length greatly exceeding the spikelets. *Stamens* 1–3. *Style* deciduous, base not tumid; stigmas 2–3. *Fruit* 3-gonous or compressed.—DISTRIB. N. temp. and arctic regions; species about 12.—ETYM. ἔριον and φορά, from the *cottony* heads.

* *Spikelet solitary terminal, ebracteate.*

1. **E. vagina'tum,** *L.*; stem glabrous, leaves filiform 3-quetrous, spike ovoid many-flowered, bristles very many.

Boggy moors, ascending to near 3,000 ft. in the Highlands; fl. April–May.—*Rootstock* short. *Stems* many, tufted, 6–10 in., longer in fruit, terete below, 3-gonous above, with 1–2 inflated leafless sheaths above the middle. *Leaves* very short. *Spikelets* ¾–1 in., erect. *Glumes* hyaline, broadly ovate, olive-green. *Fruit* obovoid, obtuse, mucronate, compressed.—DISTRIB. Europe (Arctic), excl. Turkey, Siberia, W. Asia, N.W. Tibet, N. America.

2. **E. alpi'num,** *L.*; stem rough 3-gonous, leaves setaceous, spike narrow-oblong few-flowered, bristles 4–6 crumpled.

Spongy bogs, Forfar (now extinct), Sutherland? fl. June.—*Rootstock* creeping, producing a series of stems and leaves. *Stems* 6–10 in., very slender, rigid. *Leaves* short, rough, channelled, keeled. *Spikes* ¼ in., erect, oblong-lanceolate. *Glumes* yellow-brown. *Fruit* minute, obovoid, 3-gonous.—DISTRIB. Arctic and Alpine Europe, N. Asia, N. America.

** *Spikelets in lateral corymbose cymes, drooping, bracteate.*

3. **E. polysta'chyon,** *L.*; stem rigid obtusely 3-gonous, leaves smooth flat, tip 3-gonous, bracts 2–3, spikelets 4–12, fruit obovoid mucronate.

Bogs, ascending to near 3,500 ft. in the Highlands; fl. May–June.—*Rootstock* stout. *Stems* 6–18 in., stout or slender, smooth, leafy. *Leaves* chiefly radical, variable in breadth. *Heads* rarely solitary, very variable in number, size, and length of peduncles. *Glumes* ⅛–¼ in., lead-coloured, oblong- or ovate-lanceolate, membranous. *Bristles* when fully grown 1½–2 in.—DISTRIB. Europe (Arctic), N. Asia, N. America.

Sub-sp. ANGUSTIFO'LIUM proper, *Roth* (sp.); rootstock long, stems not tufted solid, leaves channelled 3-gonous above the middle, branches of cyme smooth, glumes ovate, margins broad scarious. *E. gracile,* Sm. not Koch.

Sub-sp. LATIFO'LIUM, *Hoppe* (sp.); rootstock short, stems tufted hollow, leaves flat tip short 3-gonous, branches of cyme scaberulous, glumes lanceolate with very narrow scarious margins. *E. pubescens,* Sm.—Local; ascends only to 1,500 ft. in the N. of England; very rare in Ireland.

4. **E. grac'ile,** *Koch;* stem very slender 3-gonous, leaves very narrow 3-quetrous throughout channelled, bracts 1–2 small, spikelets 3–6, fruit narrowly obovate-lanceolate obtuse not mucronate.

Bogs, very rare, Halnaby, Yorkshire, and between Guildford and Woking; fl. June–July.—A doubtful species, intermediate between sub-sp. *angustifolium* and *latifolium*. *Stem* very slender, 1–2 ft.; leaves short, exceedingly narrow; peduncles scabrid; heads small; glumes broad, obtuse, distinctly ribbed, brown, without scarious margins; fruit very narrow.—DISTRIB. Europe (Arctic), Siberia, N. America.

6. CLA'DIUM, *P. Brown.*

Coarse, harsh, perennial, usually tall grassy herbs. *Spikelets* terete, usually panicled or cymose. *Glumes* few, concave, imbricate all round the rachis, 1–3 only flowering. *Flowers* 2-sexual, or the lower male. *Bristles* 0. *Stamens* 2–3. *Style* deciduous, tumid but not jointed at the base, stigmas 2–3. *Fruit* globose ovoid or 3-gonous, mucronate or beaked, pericarp thick corky, endocarp hard. — DISTRIB. All climates except very cold; species about 20.—ETYM. κλάδος, a *twig.*

1. **C. Maris'cus,** *Br.*; stem terete, spikelets clustered on the branches of many crowded compound cymes.

Bogs and marshes, local; Sutherland, Wigton, and Berwick only in Scotland; more frequent in Ireland; fl. July–Aug.—*Rootstock* stout, creeping. *Stems* 2–5 ft., stout, erect, terete or obscurely 3-gonous, very leafy. *Leaves* 2–4 ft., ½ in. diam., rigid, glaucous, channelled, keeled, margins serrulate, points very long. *Cymes* axillary and terminal, corymbose; branches 1–3 in., erect or recurved, bracts setaceous. *Spikelets* ¼ in., crowded in pedicelled heads ½ in. diam. *Glumes* 5–6, obtuse, pale-brown, lower short, upper oblong-lanceolate, flowering. *Flowers* about 2, one fertile. *Stamens* usually 2; anthers apiculate. *Fruit* small, ovoid, 3-gonous, beaked, brown; endocarp thick.—DISTRIB. Europe from Gothland southwards, N. Africa, Siberia.

7. RHYNCHO'SPORA, *Vahl.*

Perennial, tufted, leafy sedges. *Spikelets* terete, in axillary and terminal corymbs or panicles. *Glumes* imbricate all round the rachis, 1–2 only flowering. *Flowers* 2-sexual, or the upper 1-sexual. *Bristles* 6 or more, rarely 0. *Style-base* tumid, hardened, persistent, stigmas 3. *Fruit* compressed or 3-gonous, tipped by a tumid tubercle.—DISTRIB. Temp. and trop.; species about 50.—ETYM. ῥύγχος and σπορά, from the *beaked fruit.*

1. **R. al'ba,** *Vahl;* spikelets pale 1-flowered, bristles many barbed, stamens 2, fruit obovoid contracted below equalling the tumid tubercle.

Spongy bogs and wet meadows; fl. June–July.—*Rootstock* short. *Stems* 6–18 in., very slender, 3-gonous above. *Leaves* subsetaceous, very narrow, channelled. *Corymbs* small, ½–¾ in. diam., terminal and axillary, long-peduncled, flat-topped; bracts leafy. *Spikelets* ¼ in., crowded, white or pale brown. *Glumes* oblong-lanceolate, acuminate, keeled, membranous. — DISTRIB. Europe (Arctic), excl. Greece and Turkey, Siberia, N. America.

2. **R. fus'ca,** *R.* and *S.*; spikelets dark-brown, bristles 6 barbed upwards, stamens 3, fruit obovoid equalling the triangular serrulate tubercle.

Bogs in Glamorgan, Somerset and Dorset, very rare; more common in S.W.

Ireland ; fl. July–Aug.—Similar to *R. alba*, but more slender and rootstock elongate.—DISTRIB. Europe, excl. Spain Greece and Turkey, N.E. America.

8. SCHŒ'NUS, *L.*

Perennial, often leafless, rigid, rush-like herbs. *Spikelets* in compressed terminal bracteate heads. *Glumes* subdistichous, rigid, the upper only flowering. *Flowers* 1–4, 2-sexual. *Bristles* 1–6. *Stamens* 3. *Style* deciduous, base not tumid, stigmas 3. *Fruit* 3-gonous, obtuse or mucronate.—DISTRIB. Chiefly temp.; species about 10.—ETYM. σχοῖνος, from the use of some species as *cordage*.

1. **S. nigricans,** *L.*; stem terete, spike obovoid usually much shorter than the bract.

Bogs and wet moors, rather local; ascending to upwards of 1,000 ft. in the Highlands ; fl. June–July.—*Root tock* short, stout, branched. *Stems* 6–24 in., in dense hard tufts of matted sheaths and leaves, terete, wiry, leafless above ; sheaths copious, red brown or black, shining. *Leaves* wiry, terete, margins convolute. *Spikes* ½–¾ in., dark red-brown, shining; bract setaceous. *Spikelets* 4–10, erect, linear-oblong. *Glumes* irregularly distichous, oblong-lanceolate, subacute ; keel scaberulous. *Bristles* barbed upwards. *Fruit* small, ovoid, white.—DISTRIB. Europe, N. Africa, Siberia.

9. CYPE'RUS, *L.*

Perennial, rarely annual, rushy or grass-like herbs of various habit. *Spikelets* linear, compressed, in lateral or terminal usually bracteate heads, or branched umbels or panicles. *Glumes* many, distichous, concave, keeled, deciduous, all or most flowering. *Flowers* 2-sexual. *Bristles* 0. *Stamens* 1–3. *Style* deciduous, not tumid at the base, stigmas 2–3. *Fruit* 3-gonous or compressed.—DISTRIB. All climates but cold ; species about 300.—ETYM. The old Greek name.

1. **C. longus,** *L.*; perennial, tall, cyme umbellate, glumes erect red-brown. *Galingale.*

Marshes, very rare, Pembroke and from Kent to Cornwall; Channel Is., fl. Aug.–Sept.—*Rootstock* stout, creeping. *Stems* 2–3 ft., stout, erect, 3-quetrous, leafy at the base. *Leaves* few, flat, keeled; margins hardly scaberulous. *Rays* many, 3–6 in., slender, again umbellate. *Bracts* leaf-like, far exceeding the rays. *Spikelets* ½–¾ in., 4–8, linear, curved, distichously crowded at the top of the rays. *Glumes* lanceolate, midrib green scabrid. *Fruit* 3-quetrous, pale. — DISTRIB. Europe from France and Germany to Spain and Turkey, N. Africa.—*Rootstock* aromatic, formerly used as a medicine.

2. **C. fuscus,** *L.*; annual, dwarf, spikelets corymbose or capitate, glumes at length spreading green or pale brown.

Ditches and wet meadows, very rare, Surrey and (formerly) Middlesex ; fl. Aug.–Sept.—*Stems* 3–10 in., many ascending from a fibrous root, 3-quetrous. *Leaves* flat, spreading, grass-like. *Rays* few, short, simple, rarely divided. *Bracts* 3, leaf-like, unequal, broad at the base, curved, spreading. *Spikelets* ¼–½ in., crowded, slender. *Glumes* many, oblong-ovate, subacute ; midrib broad or narrow, smooth, green. *Fruit* minute, white.—DISTRIB. Europe from Gothland southwards, N. Africa, Siberia, W. Asia.

10. KOBRE'SIA, *Willd.*

Small perennial sedges. *Leaves* rigid, keeled. *Spikelets* crowded in a terminal compressed ovoid spike, few-flowered, some male, others male (upper) and female. *Glumes* 2–3, imbricate all round the axis, lowest flowerless. *Bristles* 0.—MALE fl. *Stamens* 3.—FEMALE fl. at the base of a convolute bract. *Ovary* 3-gonous; style-base simple, stigmas 3. *Fruit* 3-gonous.—DISTRIB. Arctic and Alpine Europe, N. Asia, Himalaya; species 2–3.—ETYM. *De Kobres*, a German patron of botany.

1. **K. caricina,** *Willd.*; lower spikelets with one female flower.

Upland moors, York, Durham, and Perth; ascending to about 2,500 ft. in the latter; fl. Aug. —*Rootstock* short. *Stems* 4–9 in., densely tufted, rigid, terete, leafy at the base only. *Leaves* 2–5 in., wiry, recurved, grooved, margins convolute. *Spike* ½–1 in., narrow. *Spikelets* subdistichous, sessile, cylindric; bracts small, lowest with a rigid serrulate point. *Glumes* ⅛ in., rigid, ovate-oblong, obtuse, pale brown, basal always empty, second of the lower spikelets female, the third male; in the upper spikelets both flowers are male. *Fruit* as long as the glumes, linear, beaked, pale.—DISTRIB. Arctic and Alpine Europe, Greenland, Rocky Mts.

11. CA'REX, *L.* SEDGE.

Perennial grasslike herbs. *Stems* usually leafy. *Spikelets* 1-2-sexual, very rarely dicœcious, terete, solitary or in heads spikes racemes or panicles, all 2-sexual or lower female with often a few male fl. at the base or top, and upper male with often a few female at the top or base. *Glumes* imbricate all round the rachis, persistent or deciduous.—MALE fl. *Stamens* 2–3, without perianth or bristles.—FEMALE fl. a compressed or 3-quetrous ovary, included in an urceolate 2-toothed sac, from which the 2–3 stigmas project. *Fruit* minute, coriaceous, compressed or 3-gonous, included in the sac (perigynium).—DISTRIB. All climates, rare in trop., abundant in Arctic and cold; species about 1,000.—ETYM. κείρω, from the *cutting* foliage.—Sometimes a slender rudimentary axis (racheola) occurs in the perigynium, at the base of the ovary.

SECTION 1. *Spikelet* solitary, terminal.

1. **C. pauciflo'ra,** *Light.*; leaves involute, spikelet ebracteate, glumes 4–6, upper male, perigynia reflexed, stigmas 3.

Moorland bogs from York and Dumfries to Sutherland; ascending to 2,700 ft. in the Highlands; absent from Ireland; fl. June–July.—*Rootstock* slender, creeping, stoloniferous. *Stems* 3–12 in., very slender, 3-gonous, smooth. *Leaves* setaceous. *Spikelets* ¼ in. *Glumes* ⅛–¼ in., rather distant, oblong-lanceolate, acute, pale, shorter than the fusiform pale beaked perigynia. *Fruit* 3-quetrous, pale.—DISTRIB. Europe, chiefly Alpine and Arctic, N. America.

2. **C. pulicaris,** *L.*; leaves involute, spikelet ebracteate, glumes 6–12 upper male, perigynia reflexed, stigmas 2.

Bogs, ascending to 2,700 ft. in the Highlands; fl. May-June.—*Rootstock* tufted; stolons 0 or short. *Stems* 3–8 in., smooth, rather rigid, terete, grooved. *Leaves* setaceous, often exceeding the stem. *Spikelets* ½–1 in. *Glumes* ⅛ in., lower sometimes remote, ovate-oblong, subacute, about ½ as

long as the ovate-lanceolate stalked compressed beaked pale perigynia. *Racheola* linear, sometimes floriferous. *Fruit* oblong, plano-convex, grey. —DISTRIB. N. and Alpine Europe, N. Asia.

3. **C. dioi'ca,** *L.*; leaves setaceous, spikelet ebracteate dicœcious or male below, glumes many, perigynia erect or spreading, stigmas 2.

Bogs and moorlands from Dorset and Sussex northwards; ascending to nearly 2,900 ft. in the Highlands; rarer in Ireland; fl. May–June.—*Rootstock* creeping, stoloniferous. *Stem* 6–12 in., terete, striate, wiry, smooth. *Spikelets: male* ½–¾ in., very narrow, cylindric, glumes oblong-lanceolate, pale; *female* ½–½ in., ovoid, glumes ovate, brown, deciduous, shorter than the sessile ovoid beaked ribbed plano-convex perigynia. *Fruit* lenticular, chesnut-brown.—DISTRIB. Europe (Arctic), Siberia, N. America.

4. **C. rupes'tris,** *All.*; leaves channelled, bract subulate or 0, glumes few, upper male, perigynia erect, stigmas 3.

Ledges of Alpine rocks in Perth, Forfar, Aberdeen and Sutherland; from 2,000–2,500 ft.; fl. July.—*Rootstock* creeping, tufted, stoloniferous. *Stems* 4–6 in., wiry, 3-gonous, rather rough. *Leaves* curved, rigid, margins recurved. *Spikelet* ½–1 in., narrow, dark-brown, shining. *Glumes,* female few, broadly ovate, obtuse or mucronate, rather shorter than the elliptic, smooth, pale, abruptly beaked perigynia. *Fruit* 3-quetrous, brown.—DISTRIB. Arctic and Alpine N. and Mid. Europe, N. Asia, N. America.

SECTION 2. *Spikelets* short, sessile, most or all 2-sexual, all similar. *Bracts* 0, or setaceous or leafy, never sheathing. *Stigmas* 2.

* *Spikelets in simple spikes or heads, male at the top only; (spike sometimes compound at the base in* 7, disticha; *see also* 11, muricata.)

5. **C. incur'va,** *Light.*; stem short, spikelets capitate, bract 0, perigynia longer than the ovate obtuse glumes, beak abrupt short smooth.

Sandy shores, E. coast, from Holy Is. northwards; absent from Ireland; fl. June–July.—*Rootstock* very long, creeping. *Stem* stout, curved, subterete, smooth, leafless. *Leaves* spreading and recurved, margins involute. *Spike* ½–¾ in., broadly ovoid. *Perigynia* elliptic-ovoid, turgid, spreading, pale, much larger than the pale brown glumes. *Fruit* ferruginous, lenticular.—DISTRIB. Scandinavia (Arctic), Italy, Turkey, Germany, Siberia, N.W. India, N. America, S. Chili.

6. **C. divi'sa,** *Huds.*; slender, spikelets short crowded bracteate, perigynia ovoid equalling the ovate cuspidate glumes, beak 2-fid serrulate.

Marshes, from York and Lincoln southwards; Dublin only in Ireland; fl. May –June.—*Rootstock* stout. *Stems* 1–3 ft., very slender, leafy, 3-gonous, scabrid above; basal sheaths leafless. *Leaves* long, very narrow, flexuous, margins involute. *Spikes* ½–1½ in., narrow, interrupted, pale brown; bracts setaceous or filiform. *Glumes* membranous. *Perigynia* not margined. *Fruit* brown, plano-convex, orbicular.—DISTRIB. Europe, from France and Germany to Italy and Turkey, N. and S. Africa, W. Siberia, N.W. India.

7. **C. dis'ticha,** *Huds.*; stems long, spikelets in an elongate head, bracts small, perigynia stipitate elliptic-ovoid ribbed exceeding the acuminate glumes, wing narrow and 2-fid beak serrulate. *C. intermedia,* Good.

Wet meadows and marshes, from Isla and Kincardine southwards; ascending to about 1,200 ft. in the Highlands; fl. June.—*Rootstock* creeping. *Stems*

1–3 ft., stouter than in *C. divisa*, leafy, 3-gonous, scaberulous above. *Leaves* ⅛–⅛ in. broad, flat. *Spike* ½–3 in., subdistichous, pale brown, sometimes compound at the base, the upper and lower spikelets usually wholly male; intermediate chiefly male; bract never large and leafy. *Fruit* ovoid, ferruginous.—DISTRIB. Europe, Siberia, Dahuria, N. America.

8. **C. arena'ria,** *L.*; stem short, spike oblong, bracts setaceous, perigynia substipitate elliptic-ovoid ribbed winged exceeding the subaristate glumes, wing broad and 2-fid beak serrulate.

Sandy sea-shores; fl. June.—Very near *C. disticha*, but habit different, shorter; leaves rigid, curved; glumes more mucronate, and fruit with a broad coriaceous wing. *Rootstock* very long, stout, branched, binding the sands. *Stems* 8–12 in., stout, curved, 3-quetrous, scabrid above. *Leaves* chiefly radical, stiff, margins involute. *Spike* 1–3 in., compressed, pale brown. *Spikelets* many, lower female, upper usually male, intermediate 2-sexual. *Fruit* plano-convex, chesnut, shining.—DISTRIB. Europe, Siberia.

** *Spikelets male at the top only, in compound heads spikes or panicles, (rarely simply spiked or capitate in* 11, muricata; *see also* 7, disticha.)

9. **C. panicula'ta,** *L.*; stout, spikelets many in an elongate panicle, perigynia ovoid truncate below broadly 3-gonous ribbed equalling the pale margined ovate subaristate glumes, beak slender 2-toothed serrulate.

Wet copses and marshes; fl. June–July.—*Rootstock* tufted, densely matted, forming large tussocks sometimes 2–4 ft. *Stems* 1–4 ft., leafy, stout, 3-quetrous, scaberulous above. *Leaves* harsh, long, narrow, flat. *Panicle* 2–6 in., very variable, rarely reduced to a simple spike, pale brown. *Branches* short; bracts 0 or setaceous. *Spikelets* crowded, pale brown. *Perigynia* truncate or cordate at the base, opaque, gradually narrowed into the long beak. *Fruit* ovoid, base narrowed, biconvex, base of style tumid.—DISTRIB. Europe from Sweden southwards, Canaries, W. Siberia.

10. **C. teretius'cula,** *Good.*; slender, panicle ovoid spikelike, spikelets few, perigynia spreading ovoid turgid ribbed below exceeding the ovate acuminate glumes, beak long rough 2-toothed.

Bogs and wet meadows, from Lanark and Moray to Devon and Kent; fl. June.—Allied to *C. paniculata*, but habit different; rootstock creeping; stems wiry, much more slender, never forming tussocks; spike shorter, broader, more simple; perigynia brown, shining, ribbed only at the base. *Fruit* obpyriform, biconvex.—DISTRIB. Europe (Arctic), except Turkey, Canaries, Himalaya, N. America, N. Zealand.—*C. Ehrhartiana*, Hoppe (*C. pseudo-paradoxa*, Gibs.), with more numerous stems and a larger more interrupted spike, found near Manchester, seems hardly a variety.

Sub-sp. PARADOX'A, *Willd.* (sp.); rootstock tufted, panicle elongate interrupted, fruit less shining more ribbed.—Bogs, very rare; Norfolk, Yorkshire, Westmeath.—A dubious plant; after examining specimens from all the localities, I regard it as a sub-species of *teretiuscula*, of which it has the foliage and most other characters.—DISTRIB. Europe (Arctic) Siberia.

11. **C. murica'ta,** *L.*; slender, spikelets few green squarrose in spikes or slender panicles, bracts 0 or setaceous, perigynia spreading elliptic-ovoid smooth longer than the acuminate glumes, beak broad serrulate 2-fid.

Marshes, copses, and wet meadows, from Elgin and Dumbarton southwards;

fl. May–June.—Densely tufted, stolons short. *Stems* 1–2 ft., wiry, 3-gonous, scaberulous above. *Leaves* shorter than the stem, narrow, flat. *Spike* very variable. *Perigynia* narrowed below, sessile, faintly ribbed, beak deeply 2-fid. *Fruit* brown, plano-convex, base of style clavate.—DISTRIB. Europe, N. Africa, N. Asia, Himalaya, N. America.

Sub-sp. MURICA'TA proper; stem erect, spike more continuous, glumes brown with green keels, beak serrulate.

Sub-sp. DIVUL'SA, *Good.* (sp.); more slender, stem curved, spike elongate much interrupted, perigynia less spreading narrower and glumes paler, beak less serrulate.—From York and Denbigh southwards.

12. **C. vulpi'na,** *L.*; stout, leaves broad flat, spike subcylindric squarrose bracteate, perigynia spreading ovoid truncate below obscurely ribbed equalling the ovate awned pale brown glumes, beak long serrulate 2-fid.

Marshy copses and saline ditches, from Elgin and the Hebrides southwards; fl. June.—*Rootstock* tufted, stoloniferous. *Stems* many, 3-quetrous, leafy, angles scabrid, faces convex. *Leaves* ¼–½ in. *Spikes* 1–3 in., variable; bracts setaceous, spreading, conspicuous. *Glumes* pale brown, midrib green, awns short scabrid. *Perigynia* compressed, ribs variable in stoutness. *Fruit* ovoid, brown.—DISTRIB. Europe, N. Africa, Siberia, N. America.

*** *Spikelets male at the base, rarely at the top also, distant, alternate, (rarely close in* 13, stellulata.) *Bracts often long and foliaceous.*

13. **C. stellula'ta,** *Good.*; slender, leaves narrow, spikelets 3–5 subglobose squarrose, bracts small, perigynia broadly ovoid plano-convex striate exceeding the ovate acute glumes, beak 2-fid broad scabrid. *C. echinata,* Murr. (an earlier name).

Moors and bogs, ascending to near 3,000 ft. in the Highlands; fl. May–June. —*Rootstock* densely tufted. *Stems* 6–18 in., 3-gonous, minutely scabrid above, stolons 0. *Leaves* channelled, shorter than the stem. *Spikes* ½–1 in., usually rather dense; upper spikelets more slender. *Glumes* pale brown; midrib green. *Perigynia* olive-green, sessile, base rounded, ribs on the sides stout, on the faces faint. *Fruit* lenticular, pale olive.—DISTRIB. Europe (Arctic), N. Africa, W. Asia, Siberia, N. America.

14. **C. remo'ta,** *L.*; slender, leaves narrow, bracts long, spikelets oblong, perigynia erect narrow-ovoid plano-convex striate exceeding the oblong-ovate acuminate glumes, beak broad and margins above serrulate.

Copses and shady places, from Argyle and Ross southwards; ascending to 1,000 ft. in N. England; fl. June. — *Rootstock* tufted with spreading branches. *Stems* 1–2 ft., inclined, obtusely 3-gonous. *Leaves* ⅛–¼ in. broad, equalling the stems, flat. *Spike* 2–5 in., rachis scabrid; lower bracts often exceeding the stem. *Spikelets* 3–9. *Glumes* pale brown, midrib broad green, margins white scarious. *Perigynia* pale, narrowed below. *Fruit* plano-convex, narrowed at the base.—DISTRIB. Europe, N. Africa, N. Asia, Himalaya, N. America.—*C. tenella,* Sm. not Schk., is a starved form.

15. **C. axilla'ris,** *Good.*; slender, leaves narrow, bracts leafy, spikelets oblong, perigynia ovate-lanceolate plano-convex ribbed about equalling the ovate acuminate glumes, beak broad flat and margins above serrulate.

Marshy meadows and damp places, rare; from York and Lancashire to Kent and Devon; S. and E. of Ireland, very rare; fl. June.—Similar to *C. remota,* but stem more 3-quetrous, taller and stouter, often very scabrid below the

spike, though sometimes smooth; lower spikelets usually compound at the base. *Fruit* lenticular, ovoid.—DISTRIB. N. Germany, Tyrol.—Probably a hybrid between *remota* and either *vulpina* or *muricata*.

C. Bœninghausenia'na, Weihe. is apparently a hybrid between *C. axillaris* and *remota*? having the 3-quetrous scabrid stem and often compound lower spikelet of *axillaris*, and the more slender habit and smaller spikelets of *remota*. *Bracts* sometimes wholly suppressed; glumes very pale and membranous. *Perigynia* as in both, shining; ripe fruit (*Herb. Boott.*) small, almost orbicular, brown, smooth.—Wet copses, &c. from Aberdeen and Banff to Kent and Sussex, not found in Ireland (rare on the Continent).

**** *Spikelets male at the base, or both at the top and base, crowded into a compact head or spike. Bracts 0 or subulate.*

16. **C. lepori'na**, *L.*; stout, leaves narrow, spike lobed compact, perigynia elliptic-ovoid plano-convex striate equalling the lanceolate acute glumes, margins winged and long 2-fid beak serrulate. *C. ovalis*, Good.

Wet places, ascending to nearly 1,700 ft. in the Lake District; fl. June.—*Rootstock* tufted; stolons 0. *Stem* 6–12 in., 3-quetrous, slightly scabrid above. *Leaves* shorter than the stem, flat, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, points fine. *Spike* $\frac{3}{4}$–1 in., often as broad, pale brown, compressed; spikelets male at the base only; bracts usually 0, sometimes subulate (*C. argyroglochin*, Lond. Cat. 1867, not Hornem.). *Glumes* pale brown, midrib green, edges whitish, acuminate or cuspidate. *Perigynia* sessile, with a thin wing from the base upwards. *Fruit* stipitate, oblong, lenticular, shining.—DISTRIB. Europe (Arctic), Siberia, W. Asia, Greenland, Rocky Mts.

17. **C. canes'cens**, *L.*; slender, leaves narrow, spike interrupted, bract 0 or minute, perigynia elliptic-ovoid plano-convex ribbed equalling the ovate acute pale glumes, beak short 2-fid serrulate. *C. curta*, Good.

Bogs and marshes, from Isla and Elgin to Devon and Kent; ascending to nearly 2,200 ft. in the Highlands; fl. June–July.—*Rootstock* tufted; stolons 0. *Stems* 12–18 in., 3-quetrous, longer than the leaves, hardly scabrid above. *Leaves* flat, $\frac{1}{10}$–$\frac{3}{4}$ in. broad. *Spike* $\frac{1}{2}$–$1\frac{1}{2}$ in., slender, spikelets 3–8, ovoid, male at the base only; bracts 0, rarely 1, subulate. *Glumes* very pale, edges broad scarious. *Perigynia* erect, pale olive, not winged, ribs slender, beak obscure. *Fruit* ovoid or obovoid, lenticular, pale.—DISTRIB. Europe (Arctic), except Spain and Turkey, N. Asia, N. America, S. Chili.

VAR. 1, *canes'cens* proper; spikelets many-flowered, glumes nearly white, beak obscurely toothed.—VAR. 2, *alpic'ola*, Wahl.; spikelets fewer few-flowered, glumes browner, beak deeply 2-fid in fruit. *C. vitilis*, Fries. More Alpine, ascends to 3,600 ft. in the Highlands; absent from Ireland.

18. **C. lagopi'na**, *Wahl.*; stem wiry, leaves flat, spikelets 2–4 small crowded, bracts minute, perigynia elliptic-ovoid biconvex ribbed exceeding the ovate acute glumes, beak short 2-fid. *C. leporina*, L. in part.

Aberdeenshire Alps, at about 3,600 ft.; very rare; fl. Aug.—*Rootstock* tufted; stolons short. *Stems* 6–10 in., 3-quetrous, often curved below, smooth or scabrid above. *Leaves* $\frac{1}{10}$–$\frac{1}{8}$ in. broad. *Spikelets* $\frac{1}{4}$ in., ovoid. *Glumes* few, broad, dark brown, midrib green, edges white. *Perigynia* red-brown. *Fruit* obovoid.—DISTRIB. Arctic and Alpine Europe, N. Asia, N. America.

19. **C. elonga'ta**, *L.*; slender, leaves narrow, spike slender, spikelets many close, perigynia elliptic-lanceolate biconvex ribbed much exceeding the ovate acute glumes, beak subulate entire decurved.

Wet copses and meadows from York and Lancaster to Essex and Surrey; Lough Neagh in Ireland; fl. June.—*Rootstock* tufted, matted; stolons 0. *Stems* very many, 1–2 ft., 3-quetrous, scabrid, graceful, leafy. *Leaves* longer than the stems, flaccid, flat, $\frac{1}{16}$–$\frac{1}{8}$ in. broad. *Spike* 1–2½ in.; bracts 0. *Spikelets* erect or spreading, lower rarely distant. *Glumes* red-brown, midrib green, edges white. *Perigynia* pale, sessile, spreading, strongly ribbed, gradually narrowed into the beak. *Fruit* oblong, obtuse, plano-convex.—DISTRIB. Europe (Arctic), Siberia, Dahuria, N.W. America.

SECTION 3. *Spikelets* 2–6, short, ovoid, approximate, all subsimilar, 2–4 lower wholly female, upper male at the base only (rarely at the top or throughout). *Lowest bract* foliaceous, sheath very short or 0. *Stigmas* 3.

20. **C. Buxbaum'ii**, *Wahl.*; leaves narrow, sheath-edges filamentous, spikelets 3–5 subsessile, perigynia green ellipsoid nerved larger than the lanceolate dark glume, beak 0. *C. canescens*, Auct.; *C. polygama*, Schkuhr.

Stony banks of Harbour Is., Lough Neagh; fl. July.—*Rootstock* short, creeping, stoloniferous. *Stems* 1–2 ft., rigid, 3-quetrous, leafy below. *Leaves* flat, $\frac{1}{8}$–$\frac{1}{4}$ in. broad; sheaths red-brown, rigid, edges filamentous. *Lower bracts* leafy, often exceeding the spike. *Spikelets* $\frac{1}{2}$–$\frac{3}{4}$ in., obtuse, conspicuous from the small dark glumes and large broad imbricating perigynia. *Glumes* rounded, mucronate acuminate or awned, dark red-brown, midrib green. *Perigynia* plano-convex, beak reduced to a 2-fid mouth, ribs slender. *Fruit* obovoid, 3-quetrous, brown, covered with white dots.—DISTRIB. Arctic and Alpine Europe, N. Asia, N. America, Australian Alps.

21. **C. alpi'na**, *Swartz;* leaves short flat, spikelets 2–4 sessile subglobose, perigynia ovoid nerveless much larger than the ovate acute blackish glumes, beak very short notched scabrid. *C. Vahlii*, Schk.

Rocky ledges of the Alps of Aberdeen and Forfar, alt. 2,400–2,600 ft.; fl. Aug.—*Rootstock* with short stolons. *Stem* 6–18 in., subsolitary, rigid, 3-quetrous, smooth or scaberulous above. *Leaves* short, recurved, $\frac{1}{8}$–$\frac{1}{6}$ in. broad. *Spikelets* $\frac{1}{4}$–$\frac{1}{2}$ in., close, lateral subhorizontal, black; bract slender. *Glumes* crowded, subacute, broad, without a green midrib. *Perigynia* broad, yellow-brown, scaberulous. *Fruit* ellipsoid or ovoid, 3-quetrous, pale.—DISTRIB. Arctic and Alpine Europe, N. Asia, Himalaya, N. America.

22. **C. atra'ta**, *L.*; leaves broad, spikelets 4–6 pedicelled inclined subcylindric, perigynia suborbicular 2-gonous compressed smooth larger than the ovate subacute blackish glumes, beak short smooth.

Ledges of Alpine rocks, N. Wales, and from Dumfries to Aberdeen, alt. 2,400–3,700 ft.; fl. July–Aug.—*Rootstock* tufted, small, stoloniferous. *Stem* 10–28 in., inclined, 3-gonous, hardly scabrid above. *Leaves* rather large, $\frac{1}{4}$–$\frac{1}{2}$ in. broad, flat, keeled. *Spikelets* $\frac{1}{2}$–$\frac{3}{4}$ in., rarely remote, uppermost sometimes wholly male; bracts usually exceeding the spikelets, sheaths very short. *Glumes* erect, imbricate. *Beak* short, slender. *Fruit* 3-quetrous, elliptic.—DISTRIB. Arctic and Alpine Europe, N. Asia, Himalaya, N. America.—Diandrous and 2-sexual flowers occur (*Boott*).

SECTION 4. *Spikelets* mainly 1-sexual, lower all or chiefly female; upper different-looking, usually more slender, all or chiefly male.

Stigmas 2 (rarely 3 in 27, *vulgaris*). *Bracts* equalling the female spike, sheaths 0. (See also 54, *vesicaria*, sub-sp. *saxatilis*, and 57, *paludosa*.)

† *Leaves with revolute or recurved margins (best seen when dry).*

23. **C. rig'ida,** *Good.*; stout, leaves broad short recurved, sheaths all leafing, edges not filamentous, spikelets erect short, perigynia obovoid lenticular green equalling the obtuse dark glumes, beak very short smooth.

Stony alpine localities, from N. Wales and Yorkshire northwards, ascending to 4,300 ft. in the Highlands; W. and N. of Ireland; fl. June–Aug. — *Rootstock* creeping, tufted or not. *Stems* rigid, 3-quetrous, usually curved, nearly smooth. *Leaves* many, stiff, keeled, $\frac{1}{6}$–$\frac{1}{4}$ in. broad. *Bracts* never much exceeding the stem. *Spikelets* very variable, subsessile; male cylindric, clavate or fusiform, sometimes female below; females 3–5, $\frac{1}{4}$–$\frac{3}{4}$ in., sometimes pedicelled, obtuse, cylindric or oblong, sometimes male at the top. *Glumes* dark, mid-rib green, edges narrow, pale. *Perigynia* broad, smooth, substipitate.—DISTRIB. Arctic and Alpine Europe, N. Asia, Himalaya, N. America.

24. **C. acu'ta,** *L.*; rigid, leaves long broad, sheath-edges not filamentous, spikelets many long, perigynia compressed green broader than the dark narrow glumes, beak very short entire. *C. gracilis,* Curtis.

Watery places, from Argyle and Moray southwards; fl. May–June.—*Rootstock* tufted, stoloniferous or not. *Stem* 2–3 ft., 3-quetrous, smooth or scaberulous. *Leaves* equalling the stem, $\frac{1}{8}$–$\frac{1}{2}$ in. broad, flaccid, lowest sheaths sometimes leafless. *Spikelets* 1–4 in., many, inclined, subsessile, sometimes long-pedicelled; males 2–4, stout or slender; females 3–5. *Glumes* obtuse acute or cuspidate, midrib green. *Perigynia* elliptic or suborbicular, smooth, substipitate, variable in size and breadth; ribs faint, beak smooth. *Fruit* planoconvex, orbicular or obovoid.—DISTRIB. Europe (Arctic), N. and W. Asia, E. and W. N. America.—Perigynia sometimes antheriferous.

25. **C. stric'ta,** *Good.*; slender, leaves long erect flat, sheath-edges filamentous, lower leafless, spikelets sessile, perigynia orbicular-ovoid compressed green nerved much larger than the oblong obtuse dark glumes, beak very short notched. *C. cæspitosa,* Gay not L.

Marshy places, local, from Durham and Westmoreland to Kent and Dorset; common in Ireland; fl. May–June.—*Rootstock* in large dense tufts. *Stems* 1–3 ft., 3-quetrous, slightly scabrid above. *Leaves* $\frac{1}{8}$–$\frac{1}{4}$ in. diam., long, flaccid; leafless sheaths long, strict, red-brown, shining. *Bracts* 0, or very variable. *Spikelets* $\frac{3}{4}$–2 in., erect, cylindric; males 1–2, slender; females 1–3, sometimes male above, stout. *Glumes* in about 8 rows, pitchy, midrib green; of the male very narrow, subacute. *Perigynia* large, much compressed, ribs slender. *Fruit* oblong.—DISTRIB. Europe, N. Africa.

†† *Leaves with incurved or involute margins (best seen when dry).*

26. **C. aquat'ilis,** *Wahl.*; stems stiff, leaves long erect flat, spikelets 3–6 cylindric, perigynia suborbicular compressed pale smooth nerveless rather larger than the dark obtuse glumes, beak short smooth or 0.

Bogs and marshes in Lanark, Fife, Forfar, and Aberdeen; ascending to 3,300 ft.; absent from Ireland; fl. June–Aug.—*Rootstock* tufted, creeping, stoloniferous. *Stem* 10–24 in., 3-gonous, stout, polished, leafy below. *Leaves* $\frac{1}{8}$–$\frac{1}{2}$ in., broad; sheaths all leafing, not filamentous. *Spikelets* 1–2½ in., slender, lower usually pedicelled; males 1–3, more slender and pale; bracts long, leafy. *Glumes* oblong or ovate, midrib bright green, margins not pale. *Perigynia* much compressed, very pale brown. *Fruit* variable, ovoid obovoid or orbicular, lenticular or 3-quetrous. — DISTRIB. Scandinavia (Arctic), Greenland, N. America.

VAR. 1, *aquat'ilis* proper ; stem tall scaberulous above, bracts long, spikelets large pale. Lowlands.—VAR. 2, *mi'nor*, Boott ; stem shorter smooth, leaves narrower, bracts shorter, spikelet smaller, glumes darker purple brown. Var. *Watsoni*, Syme. Clova Mts.

27. **C. vulga'ris,** *Fries;* leaves very narrow erect, spikelets 3–5 sessile short, perigynia suborbicular plano-convex nerved below larger than the obtuse dark glumes, beak very short terete smooth. *C. cæspitosa*, Sm.; *C. Goodenovii*, Gay.

Marshes and wet meadows, ascending to nearly 3,000 ft.; fl. May–July.—*Rootstock* very variable, tufted or creeping, sometimes extensively. *Stem* 6–24 in., 3-quetrous, scaberulous above, rigid, short and curved or long slender and erect. *Leaves* usually very slender, $\frac{1}{12}$–$\frac{1}{8}$ in. broad, at others short, recurved, $\frac{1}{4}$ in. broad. *Spikelets* $\frac{1}{2}$–1 in., erect, close or rather distant. *Glumes* imbricate, concolorous or midrib green. *Perigynia* usually obtuse, green or olive, sometimes pitchy, much compressed, nerves slender, sometimes confined to the base. *Fruit* orbicular, lenticular, rarely 3-quetrous. —DISTRIB. Europe (Arctic), N. America.

VAR. ? *Gibso'ni*, Bab. (sp.) ; glumes $\frac{1}{3}$ shorter than the more elongate acute fruit. Hebden Bridge, Yorkshire ; now extinct. This I have not seen.

** *Stigmas* 3. *Beak of perigynium* short or 0; mouth truncate, entire or obliquely notched (rather long in 33, *vaginata*, and 34, *capillaris*.) (See also 27 *vulgaris*, 45 *extensa*, 53 *strigosa*, 54 *vesicaria*, sub-sp. *saxatilis*, 57 *paludosa*, and 58 *riparia*.)

† *Perigynia glabrous.*

28. **C. limo'sa,** *L.*; stem filiform, leaves narrow glaucous, bracts short, female spikelets 1–2 drooping short, pedicels capillary, perigynia ellipsoid green equalling the broad cuspidate pale glumes, beak very short entire.

Spongy bogs, from Skye and Sutherland to Hants and Dorset; fl. June. — *Rootstock* slender, creeping. *Stem* 6–12 in., 3-quetrous, scabrid above. *Leaves* as long, $\frac{1}{12}$ in. broad, recurved, margins scabrous. *Male spikelet* solitary, erect, slender, sometimes female at the top; *females* 1–3, $\frac{1}{4}$ in., about equalling the pedicels, cylindric-oblong; bracts scarcely sheathing. *Glumes* few, large, lax, midrib greenish ribbed, edges brown. *Perigynia* obscurely 3-gonous, not shining, cuspidate, glaucous. *Fruit* oval, 3-gonous.—DISTRIB. Europe (Arctic), excl. Turkey, Siberia, W. Asia, N. America.

Sub-sp. IRRIG'UA, *Hoppe* (sp.); stem almost smooth, leaves flat shorter scarcely glaucous, glumes larger, points elongate, midrib not green, perigynia more turgid.—Peat-bogs, Northumberland, Dumfries, Perth, Forfar, &c.

29. **C. rariflo'ra,** *Sm.*; stem wiry, leaves narrow erect, bracts short, female spikelets 2–3 pendulous few-flowered, perigynia pedicelled elliptic or obovoid green embraced by the obtuse shining glume, beak short entire.

Alpine bogs of Forfar, Aberdeen, Banff, and Moray, from 2,400–3,000 ft. ; fl. June–July.—*Rootstock* creeping. *Stem* 3-gonous, 6–12 in., smooth, leafy below only. *Leaves* flat, $\frac{1}{12}$ in. *Male spikelet* 1, short, suberect ; *female* $\frac{1}{4}$ in., about equalling the capillary pedicels, 6–8-flowered. *Glumes* pale brown, membranous, concolorous, midrib indistinct. *Perigynia* brown, 3-gonous, smooth, obscurely nerved. *Fruit* oblong, 3-gonous, dotted.—DISTRIB. Scandinavia (Arctic), Kamtschatka, N. America.

30. **C. glau'ca,** *Murr.*; stem wiry, leaves narrow flat glaucous, female spikelets 4–6 suberect cylindric many-flowered, perigynia sessile turgid equalling the short dark glumes, beak short terete deflexed entire.

Rocks, woods and pastures, ascending to 2,000 ft. in Yorkshire; fl. June–July.—*Rootstock* creeping, stoloniferous. *Stems* few, ½–2 ft., trigonous, smooth. *Leaves* erect or recurved, ⅛–¼ in. broad. *Male spikelets* several; *female* ½–2 in., shortly pedicelled; bracts with short sheaths or 0. *Glumes* close-set, acute or obtuse, dark brown, midrib greenish, margins green or not. *Perigynia* not ribbed, obovoid or orbicular, rough.—DISTRIB. Europe, N. Africa, Siberia.

VAR. 1, *glau'ca* proper; spikelets cylindric, glumes acute. *C. recurva,* Huds. —VAR. 2, *Micheli'na,* Sm. (sp.); spikelets cylindric, glumes obtuse. Alpine.—VAR. 3, *stictocar'pa,* Sm. (sp.); spikelets short, glumes acuto, fruit dotted. Alpine.

31. **C. palles'cens,** *L.*; stem wiry, leaves hairy erect flat, female spikelets 2–3 close oblong, perigynia elliptic 3-gonous obtuse smooth shining green larger than the ovate cuspidate glumes, beak obscure entire.

Marshy copses and meadows, ascending to nearly 1,900 ft. in the Highlands; fl. June–July.—*Rootstock* tufted, stolons 0. *Stems* 1–2 ft., 3-quetrous, slender, often leafy, scaberulous. *Leaves* ⅛–⅙ in. broad, green; hairs scattered, soft. *Male spikelet* erect, pale yellow-red; *female* 2–3, ½ in., shortly pedicelled; bracts foliaceous, sheaths short. *Glumes* few, very pale brown, margins whitish, midrib green. *Fruit* obovoid, 3-quetrous, punctate and striate. —DISTRIB. Europe (Arctic), excl. Spain, Siberia, N. America.

32. **C. panic'ea,** *L.*; stem curved, leaves glaucous flat, bract-sheaths long, spikelets oblong, perigynia 3-gonous smooth punctulate exceeding the ovate dark glumes, beak very short terete decurved obliquely notched.

Wet meadows, marshes, &c., ascending to nearly 2,300 ft. in the Highlands; fl. June–July.—*Rootstock* tufted, creeping, stoloniferous. *Stem* 1–2 ft., leafy. 3-gonous, smooth. *Leaves* ⅛–¼ in. broad, margins rough. *Male spikelets* 1–2, narrow, clavate; *female* 2–4, ½–¾ in., rather distant, inclined, oblong or cylindric, dark, lower rarely long-pedicelled; bracts variable. *Glumes* variable, obtuse acute or cuspidate, midrib broad green rarely concolorous, edges pale. *Perigynia* ovoid, pale brown, nerves obsolete. *Fruit* 3-quetrous, brown, dotted.—DISTRIB. Europe (Arctic), N. Asia, N. America.

33. **C. vagina'ta,** *Tausch;* stem curved, leaves recurved keeled, bract long sheath loose, spikelets short lax-flowered, perigynia 3-gonous turgid smooth longer than the ovate brown obtuse glumes, beak cylindric decurved obliquely 2-fid. *C. salina,* Don; *C. Michelhoferi,* and *C. phæostachya,* Sm. not Schk.; *C. scotica,* Spr.; *C. sparsiflora,* Steud.

Rocky ledges of the Alps of Loch Lomond, Perth, Forfar, Aberdeen, and Sutherland, at 2,000–3,800 ft.; fl. July.—Habit, &c. of *C. panic'ea,* but leaves more radical, broader, recurved, never glaucous; bracts shorter, sheaths looser; spikelets laxer-flowered; glumes paler and more obtuse; perigynia more elongate obovoid and decurved, beak longer, cylindric. *Fruit* elliptic 3-quetrous, beaked.—DISTRIB. Scandinavia (Arctic), N. Russia, Austria, Germany, Siberia, Arctic America.—The stigmas vary from 2–4, *Boott.*

34. **C. capillar'is,** *L.*; stem short, leaves recurved flat, bracts large sheath long, female spikelets few-flowered pendulous, perigynia pedicelled

elliptic-lanceolate 3-gonous smooth shining much exceeding the pale hyaline obtuse glumes, beak thin slender entire.

Grassy, chiefly alpine banks and rocks, N. of England and throughout Scotland; ascending to 2,700 ft. in the Highlands; absent from Wales and Ireland; fl. June-July.— *Rootstock* tufted. *Stem* 4–8 in., 3-gonous, smooth. *Leaves* chiefly radical, soft. *Spikelets* small; *male* very slender; *female* 2–3, ¼–⅓ in., shorter than the capillary pedicel; upper bracts with hyaline tips, lower much larger. *Glumes* scattered, embracing the fruit, caducous, margins broad pale, nerves brown. *Perigynia* slightly decurved, not ribbed. *Fruit* elliptic-ovoid, 3-quetrous.—DISTRIB. Arctic N. and Alpine Europe, N. Asia, N. America.

35. **C. pen'dula,** *Huds.*; stems tall leafy, leaves broad flat, bract-sheaths long, spikelets many very long slender drooping, perigynia ovoid turgid 3-gonous smooth membranous green much exceeding the awned glumes, beak short terete decurved smooth notched.

Damp woods, &c., from Lanark and Elgin southwards; local in Ireland; fl. May-June.—*Rootstock* tufted, stolons 0. *Stem* 3–6 ft., 3-gonous, smooth or scaberulous. *Leaves* pale-green, not glaucous beneath, ⅓–½ in. broad. *Spikelets* 3–5 in., *males* 1–3, inclined, sometimes interruptedly male and fem., or fem. at the base only; *female* subsessile, graceful, curved, obtuse, dense-flowered, pedicels wholly included in the very leafy bracts. *Glumes* spreading, small, oblong, obtuse or 2-fid, pale brown, awn hispid, midrib green, margins pale ragged. *Perigynia* narrow at both ends, gibbous above. *Fruit* short, broad, pale, 3-quetrous.—DISTRIB. Europe from Belgium southwards, N. Africa.

†† *Perigynia hairy. Spikelets short in all but* 41, 42.

36. **C. præ'cox,** *Jacq.*; leaves short flat curved, bract-sheaths short, spikelets few close, perigynia broadly ellipsoid turgid 3-gonous hispid brown equalling the brown obtuse or cuspidate glumes, beak very short.

Moors, heaths, and pastures; ascends to nearly 2,300 ft. in the Highlands; fl. April-May.—*Rootstock* creeping, stoloniferous. *Stems* 6–12 in., 3-gonous, quite naked above, smooth or slightly scabrid. *Leaves* ⅛–⅙ in. broad, densely tufted, keeled. *Spikelets* crowded, subsessile; *male* solitary, slender, erect; *female* 2–3, ⅓–½ in., inclined, oblong, rather dense-flowered. *Glumes* small, broad, edges brown, midrib green; bracts very variable. *Perigynia* subsessile, coriaceous, olive, opaque. *Fruit* 3-gonous, short, brown, crowned with a minute ring.—DISTRIB. Europe, N. Asia; introd. in N. America.

37. **C. tomento'sa,** *L.*; slender, leaves glaucous beneath, bract-sheaths 0, spikelets few short close, perigynia obovoid turgid 3-gonous pubescent green exceeding the small acute glumes, beak very short notched.

Wet meadows, Marston Measey, Wilts; fl. June.—*Rootstock* creeping, stoloniferous. *Stems* 10–18 in., 3-quetrous, scaberulous above. *Leaves* ⅛ in. broad, curved, glabrous, flat. *Spikelets* subsessile; *male* solitary, erect; *female* 1–2, inclined, ¼–½ in.; bracts long or short. *Glumes* very small, ovate, sometimes cuspidate, midrib green, edges brown. *Perigynia* coriaceous, beak distinct slightly decurved. *Fruit* 3-gonous, obovoid, pale.—DISTRIB. Europe, from the Baltic Is. southwards to France, and E. to Italy and Turkey.

38. **C. pilulif'era,** *L.*; slender, leaves recurved, bract-sheath 0, spikelets

few short few-flowered close, perigynia stipitate subglobose pubescent equalling the ovate cuspidate brown glumes, beak very short notched.

Heaths, woods, and moors, ascending to 3,300 ft. in the Highlands; fl. June. —*Rootstock* tufted, stolons 0. *Stem* 6–20 in., 3-gonous, scaberulous. *Leaves* ⅛–⅛ in. broad, chiefly radical, short, flat, keeled. *Spikelets* sessile; *male* solitary, slender; *female* ⅛–⅓ in., subglobose; bracts hardly leafy. *Glumes* rather spreading, brown, midrib green, edges brown or narrowly pale. *Perigynia* opaque, hardly 3-gonous, pedicel flat. *Fruit* subglobose, brown. —DISTRIB. Europe (Arctic), W. Asia, Kamtschatka, N. America.

39. **C. monta'na,** *L.*; slender, leaves narrow, bract glumaceous, spikelets few small close, perigynia obovoid 3-gonous hirsute ribbed exceeding the polished obovate mucronate glumes, beak notched.—*C. collina,* Willd.

Heaths, woods, and fields, local; Worcester, Hereford, Monmouth, Gloucester, and Sussex; fl. April–May. — *Rootstock* very stout, creeping and tufted. *Stems* 6–18 in., 3 quetrous, strict, then curved, slightly scabrid above. *Leaves* ⅛–⅛ in. broad, usually shorter than the stem, straight or flexuous; young pubescent. *Spikelets* sessile, usually very close, bright red-brown, polished; *male* ⅓ in., solitary, stout; *females* 1–3, ⅛–⅓ in., more slender, few-flowered; bract broad, with or without a subulate awn or green point, sheath very short. *Glumes* broad, chesnut-brown, embracing the spreading substipitate perigynia, obtuse or retuse and mucronate, midrib pale, edges brown. *Fruit* pedicelled, pale.—DISTRIB. Europe, W. Siberia.

40. **C. ericeto'rum,** *Poll.*; stem short curved, leaves recurved keeled, bract glumaceous, spikelets few capitate, perigynia obovoid pubescent equalling the broadly ovate obtuse ciliate brown glumes, beak entire.

Chalk banks, Gogmagog Hills, Cambridge; fl. May–June.—*Rootstock* branched, creeping and tufted. *Stems* 2–6 in., 3-gonous, stiff, smooth. *Spikelets* sessile, small; *male* ½ in., solitary, fusiform; *female* ⅙–¼ in., 6–10-flowered; bracts hardly sheathing. *Glumes* pale brown, midrib concolorous, margins broad, white, scarious. *Perigynia* subsessile, opaque, short. *Fruit* obovoid, sessile, pale, 3-quetrous.—DISTRIB. Europe (Arctic), Siberia, Dahuria.

41. **C. digita'ta,** *L.*; stem slender curved, leaves recurved flat, bract subulate, sheath long brown, spikelets slender curved, perigynia remote stipitate narrow-obovoid 3-gonous pubescent embraced by the mucronate shining glumes, beak very short straight entire.

Copses on limestone, Yorkshire, Notts, Hereford, Gloucester, Somerset, Wilts; fl. May.—*Rootstock* very stout, tufted. *Stem* 6–10 in., smooth, obtusely 3-gonous. *Leaves* ⅛–⅛ in. broad, soft, flat, linear. *Spikelets* and their slender pedicels enclosed in the bracts; *male* solitary, ½–¾ in., *female* ½–1 in., 6–8-flowered; bracts membranous, brown, tip green subulate. *Glumes* convolute, broad, obtuse, scarious, pale red-brown, shining, midrib narrow green, margins hyaline. *Perigynia* concealed, curved, green, beak terete. *Fruit* stipitate, 3-quetrous, brown.—DISTRIB. Europe, Siberia.

42. **C. hu'milis,** *Leyss.*; stem shorter than the stiff involute curved leaves, bracts glumaceous, spikelets very remote slender lax-flowered, perigynia stipitate narrow-obovoid 3-gonous pubescent embraced by the very broad scarious glumes, beak short entire or 0. *C. clandestina,* Good.

Dry grassy hills, Hereford, Gloucester, Wilts, Somerset, Dorset; fl. May.—

Rootstock very stout, creeping, tufted. *Stems* 1–3 in., 3-gonous, smooth, concealed amongst the narrow leaves. *Spikelets* white, scattered up the whole stem; *male* solitary, narrow, ¼–½ in.; *female* 3–5, ⅛–¼ in., enveloped in the obtuse apiculate or truncate scarious silvery bracts. *Glumes* silvery, clouded with pink and green. *Perigynia* greenish, 1-ribbed on 2 faces, beak variable. *Fruit* 3-quetrous, pale brown, smooth, beaked.—DISTRIB. Europe from Belgium southwards, Siberia.

*** *Stigmas* 3 (2–3 in 57, *paludosa*). *Fruit* with a long, usually slender, often forked beak (beak short in 45 *extensa*, 53 *strigosa*, 54 *vesicaria* sub-sp. *saxatilis*, 57 *paludosa*, and 58 *riparia*; see also 33 *vaginata* and 34 *capillaris*).

† *Perigynia hairy, nerved. Male spikelets several.*

43. **C. hir'ta,** *L.*; leaves long flat hairy, bracts leafy, sheaths long, spikelets long-pedicelled erect cylindric, perigynia ovoid turgid ribbed usually hirsute much longer than the ovate awned glumes, beak 2-cuspidate.

Damp copses, &c. from Cantire and Moray southwards, and in Ireland; ascending to 1,200 ft. in N. of England; fl. May–June.—*Rootstock* long, creeping, jointed, scaly. *Stem* slender, 1–2 ft., leafy, glabrous, 3-gonous, shining. *Leaves* ¼–½ in. broad, sheaths split. *Spikelets; male* 2–3, close, ½–1 in., pale, glistening; *female* 2–5, 1–1½ in., green, distant; pedicels exserted; lower bract exceeding the stem. *Glumes* small, broad, scarious, midrib green herbaceous, awn rigid scabrid often spreading; of male lanceolate hyaline. *Perigynia* large, ⅛ in., sessile, plano-convex, narrowed into the beak. *Fruit* 3-quetrous, beaked, pale brown.—DISTRIB. Europe, N. Africa, Siberia, Dahuria.—Syme describes a var. *hirtiformis*, Pers., with glabrous leaves and glumes; and var. *ebracteata* (found near Epsom), with glabrous obtuse glumes and leaves and bracts reduced to a subulate point, which resembles *C. ovalis*.

44. **C. filifor'mis,** *L.*; slender, leaves very long involute, bracts long sheaths short, spikelets erect, perigynia narrow-ovoid turgid pubescent equalling the lanceolate acuminate glumes, beak 2-cuspidate.

Bogs and marshes, local; rare in Ireland; fl. May.—*Rootstock* creeping, stoloniferous. *Stem* 2–3 ft., slightly scabrid above, 3-gonous, leafy. *Leaves* numerous, very slender, stiff; sheaths red-brown, stout, lower 2–3 very long, edges filamentous, without a blade. *Male spikelets* 2–3, very slender, 1–2½ in., brown; *female* 1–3, ½–1 in., rather lax-flowered; lower bracts filiform, overtopping the stem. *Glumes* chesnut-brown, with concolorous margins; midrib green, of male fl. narrower and more membranous. *Perigynia* ⅛ in., plano-convex, green, narrowed into the beak. *Fruit* stipitate, 3-quetrous.—DISTRIB. Europe (Arctic), Siberia, N. America.

†† *Perigynia glabrous. Male spikelets solitary; females short, distant, pale. Bracts leafy, sheaths long (except* 45 extensa *and* 46 flava).

45. **C. exten'sa,** *Good.*; slender, leaves setaceous, bracts very long, sheaths short, spikelets subsessile dark, perigynia rhombic or elliptic-obovate 3-gonous inflated ribbed much larger than the broad mucronate glumes, beak short straight smooth 2-toothed.

Brackish marshes; fl. June.—*Rootstock* tufted. *Stem* 10–18 in., 3-gonous, smooth, slender. *Leaves* mostly below the middle, ⅛–⅛ in. broad, rigid, flexuous, shorter than the stem; margins involute. *Spikelets* 3–4, sub-

sessile; *male* ½–¾ in., slender, brown; *females* 2–4, ½–¾ in., 2 upper or all contiguous; bracts at length horizontal, sheath very variable in length. *Glumes* small, acute or mucronate, brown, midrib green, edges concolorous. *Perigynia* rather spreading, opaque, coriaceous, dull green, dotted, gradually narrowed into the beak. *Fruit* shortly elliptic, olive-brown, 3-quetrous.—DISTRIB. Europe, N. Africa, W. Asia, N. and S. America to Patagonia.

46. **C. fla'va,** *L.*; stem curved, leaves flat, bracts long, sheaths short, spikelets oblong green, perigynia spreading or deflexed ovoid 3-gonous inflated ribbed much exceeding the obtuse glumes, beak long slender scabrid 2-cuspidate.

Heaths, bogs, and marshes, ascending to near 2,900 ft. in the Highlands; fl. May–June.—*Rootstock* tufted, stolons 0. *Stem* 3–18 in., curved, 3-gonous, angles rather acute. *Leaves* ⅛ to nearly ¼ in. broad, chiefly radical, often recurved, shorter than the stem, usually flat. *Spikelets* usually contiguous, sessile or pedicelled; *male* ½–1 in., fusiform; *females* 2–4, ¼–½ in., subcylindric, squarrose; bracts spreading, sheaths very variable. *Glumes* small, obtuse or subacute, usually green clouded with brown. *Perigynia* sessile, variable in size, green, coriaceous, gradually narrowed into the beak. *Fruit* short, 3-gonous, olive-brown, angles acute.—DISTRIB. Europe (Arctic), Madeira, W. Asia to India, N. America.—In the following varieties the spikelets are so variable that I have not introduced them.

VAR. 1, *fla'va* proper; beak of perigynium decurved scabrid.—VAR. 2, *Œ'deri,* Ehr. (sp.); usually smaller, beak of smaller perigynium straighter scabrid.—VAR. 3, *lepi'docarpa,* Tausch (sp.); perigynium small, beak short nearly straight almost smooth.

47. **C. dis'tans,** *L.*; slender, leaves flat, bracts leafy, sheaths long, spikelets distant lower pedicelled, perigynia suberect ovoid turgid ribbed exceeding the ovate glumes, beak flat 2-cuspidate scabrid.

Marshes and wet meadows, ascending to nearly 1,900 ft. in the Highlands; absent in Devon? and Cornwall; fl. June.—*Rootstock* tufted, creeping. *Stem* 10–18 in., 3-gonous, smooth or slightly scabrid above, leafy below the middle. *Leaves* ⅛–¼ in. broad, glaucous, often recurved. *Spikelets, male* ½–1 in., long-pedicelled, slender; *females* 1–3, ½–1 in., very distant, erect, cylindric-oblong; lower bract not equalling the stem, and often not its spikelet. *Glumes* broad, subacute, brown, midrib green, margins and tip white. *Perigynia* sessile, green, opaque, gradually narrowed into the slender flattened short straight beak, mouth membranous. *Fruit* broad, obovoid, 3-quetrous, brown.—DISTRIB. Europe, N. America?

Sub-sp. DIS'TANS proper; leaves darker, bracts usually longer, female spikelets 3–4 longer, glumes more obtuse mucronate or awned less hyaline at the tip, perigynia broader black-dotted.—Brackish marshes; extends to N. Africa. I do not find the fruit to differ constantly from *C. fulva.*

Sub-sp. FUL'VA, *Good.* (sp.); bracts rarely equalling the stem, female spikelets 2–3, glumes obtuse or acute not mucronate, tips more or less hyaline, perigynia broad at the base not dotted.—VAR. 1, bracts long, female spikelets usually 2, edges of beak scabrid.—VAR. 2, *Hornschuchia'na,* Hoppe (sp.); bracts shorter, female spikelets usually 3 longer pedicelled, beak smoother. *C. speirostachya,* Sm. Chiefly subalpine.

48. **C. biner'vis,** *Sm.*; slender, leaves rigid recurved flat, bracts leafy, sheaths long, spikelets all pedicelled cylindric, perigynia ovoid 3-gonous

faintly ribbed green much exceeding the oblong-ovate glumes, beak flattened 2-cuspidate scabrid.

Heaths, moors, &c.; ascending to nearly 3,200 ft. in the Highlands; fl. June–July.—Very similar to *C. distans*, and perhaps another sub-sp. of *fulva*, but much coarser, often 3 ft.; rootstock stout, tufted, creeping; stem 3-quetrous, smooth, leafy; leaves often short, more rigid, keeled and recurved; female spikelets ½–1 in., browner, more numerous, stouter, longer; beak stouter and more 2-fid; glumes obtuse or mucronulate, red-brown; perigynia and leaves beneath at times dotted; I do not find the fruit always obovate, but like *fulva*.—DISTRIB. Europe excl. Turkey, N. Africa, W. Asia.

49. **C. lævigata,** *Sm.*; tall, leaves short broad, spikelets distant pedicelled inclined or drooping cylindric, perigynia subsessile elliptic-oblong or ovoid turgid ribbed green dotted longer than the acuminate glumes, beak long slender 2-cuspidate.

Wet copses and marshes, from Mull and Aberdeen southwards; ascending to 1,000 ft. in Northumberland; fl. June.—Closely allied to *C. binervis*, but much larger, 1–3 ft., leaves almost ⅛ in. broad, dotted beneath; sheath auricled opposite the blade; male spikelets 1–2¼ in., 3-gonous, rarely 2, with obtuse mucronate glumes; females 1½–2 in., drooping; perigynia nearly ⅛ in., 3-gonous, opaque, purple-dotted, beak obscurely scabrid, cusps long, nearly straight. *Fruit* stipitate, 3-quetrous, dotted, pale.—DISTRIB. Europe from Holland southwards, N. Africa, N. America.

50. **C. punctata,** *Gaud.*; slender, leaves short flat subrecurved, bracts leafy, sheaths long, perigynia spreading ovoid membranous turgid dotted not ribbed shining longer than the ovate glumes, beak slender 2-fid smooth.

Marshy places near the sea, Cornwall? Kerry, Cork, Guernsey; fl. June.—Similar to *C. distans*, but very distinct in the tumid shining membranous hardly 3-gonous perigynia, ribbed at the 2 obscure angles only, and the more slender smooth subtereto beak. *Glumes* obtuse or mucronulate, mucro scabrid.—I do not find the fruit to differ materially from *fulva*.—DISTRIB. Norway, France, Italy, Switzerland, Azores.

51. **C. depauperata,** *Good.*; slender, leaves long flat, bracts leafy, sheaths long, spikelets 3–4-flowered green, perigynia pedicelled narrowed at both ends turgid ribbed green much larger than the lanceolate pale glumes, beak slender tip membranous.

Dry woods, Surrey, Somerset, and Kent, very rare; fl. May–June.—*Rootstock* tufted, shortly creeping. *Stems* 10–24 in., 3-gonous, slender, smooth, leafy. *Leaves* ⅛–⅛ in. broad. *Bracts* scabrous, almost equalling the stem, flat. *Spikelets* erect, very short and distant; *male* very slender, 1–1½ in., many-flowered; *females* 3–5, ½–⅔ in., pedicel of lowest sometimes 2–3 in. *Glumes* remote, membranous, acuminate, embracing the base of the perigynia, back green; of the male numerous, obtuse, ciliate. *Perigynia* large, nearly ¼ in.; obscurely 3-gonous, polished, ribs many slender; beak very long, straight, obscurely scabrid. *Fruit* obovoid, or obtusely 3-gonous, pale.—DISTRIB. Europe from France and Spain, eastwards to Russia, N. Asia.

††† *Perigynia glabrous. Male spikelet solitary; female long, curved or drooping. Bracts leafy, sheaths long.*

52. **C. sylvatica,** *Huds.*; slender, leaves flat broad soft, spikelets long-pedicelled very slender drooping lax-flowered, perigynia stipitate

short turgid 3-gonous equalling the lanceolate thin pale glumes, beak membranous very long slender 2-fid.

Damp woods, from Lanark and Moray southwards; ascending to 2,000 ft. in the Highlands; fl. May–June.—*Rootstock* tufted, shortly creeping. *Stem* 1–3 ft., very slender, 3-quetrous, smooth. *Leaves* ⅛–⅛ in. broad, membranous, bright green. *Spikelets* 1–1½ in., distant or contiguous; *male* slender, pale; *females* very slender, sometimes branched at the base; bracts leafy, sheaths long. *Glumes* lax or scattered, acuminate, membranous, with pale green back and keel; of the males brownish, obtuse, mucronate or subacute. *Perigynia* subsessile, elliptic, rather small, brown, straight, rather shorter than the slightly compressed herbaceous smooth beak, angles ribbed, faces quite smooth. *Fruit* broad, 3-quetrous.—DISTRIB. Europe, N. Asia.

53. **C. strigo'sa,** *Huds.*; leaves flat broad, spikelets very slender drooping, perigynia remote elliptic-lanceolate 3-gonous ribbed a little longer than the oblong-lanceolate acute glumes, beak obscure obliquely truncate smooth hyaline.

Woods and copses, from York and Chester to Kent and Dorset, rare and local in Ireland; fl. May–June.—*Rootstock* tufted, creeping. *Stems* 1–2 ft., smooth, 3-gonous, leafy. *Leaves* ⅛–½ in. broad, usually short, pale green, flaccid; sheaths with 2 auricles opposite the blade. *Male spikelet* 1, ½–2 in., slender, pale; *females* 1½–3 in., lowest long-pedicelled, often flexuous; rachis evident between the glumes, many-flowered; bracts leafy, usually shorter than the stem, sheaths long. *Glumes* small, membranous, white, base enveloping the perigynia, centre pale green. *Perigynia* ⅛ in., membranous, green, slightly decurved, narrowed at both ends. *Fruit* narrow-elliptic, 3-gonous, pale.—DISTRIB. Europe from Denmark southwards, excl. Spain Greece and Turkey, W. Asia, N. Africa.—Allied to *C. sylvatica.*

†††† *Perigynia glabrous. Male spikelets several (rarely one in* 54 vesicaria); *female stout, usually curved or drooping. Bracts leafy, sheath* 0.

54. **C. vesica'ria,** *L.*; stout, leaves flat, spikelets cylindric, perigynia large spreading conic-ovoid inflated ribbed pale exceeding the lanceolate subacute scarious-tipped glumes, beak stout 2-cuspidate smooth.

Bogs and marshes, from Isla and Moray southwards; fl. May–June.—*Rootstock* tufted and creeping. *Stem* 1–2 ft., stout, scabrid, 3-quetrous. *Leaves* long, ⅛–¼ in. broad, soft, sheath-edges filamentous. *Spikelets* many, stout; *males* 1–3, 1½–2½ in., slender, pale brown, sometimes female at the top; *female* 1–3 in., shortly pedicelled, inclined or drooping, cylindric, ½ in. diam. when ripe; bracts overtopping the stem, sheath 0. *Glumes* much smaller than the perigynia, narrow, chesnut-brown, midrib pale, tip obtuse; of the males linear-oblong. *Perigynia* nearly ¼ in., obscurely 3-gonous, nerves faint, dull yellow, shining; beak rigid, brown, pungent. *Fruit* broadly elliptic, 3-gonous, pale, beak long.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, W. Asia to N.W. India, Greenland.—Babington gives a var. (*C. involuta,* Bab.) which is intermediate between this and *C. ampullacea,* with involute leaves, found in Lancashire and Cheshire.

Sub-sp. VESICA'RIA proper; stem 1–2 ft., male spikelets 2–3, female large 1–2½ in. stout cylindric pale, perigynia elongate ribbed with a slender rigid 2-cuspidate beak, stigmas 3.—VAR. *Gra'hami,* Boott (sp.); perigynia brown less strongly nerved, beak shorter less strongly cuspidate more slender, stigmas 2. Highlands, rare.

Sub-sp. SAXAT'ILIS, *L.* (sp.); stem 4–10 in., male spikelet 1 rarely 2, female small ¼–⅜ in. ovoid very dark, perigynia ovoid ribs faint or 0 with a short notched or 2-fid beak, stigmas usually 2. *C. pulla*, Good.; *C. vesicaria*, var. *alpigena*, Fries.—Bogs in the Scotch Alps from Ben Lomond northwards, from 2,500 ft. to near 3,100 ft.—DISTRIB. Scandinavia, N. Russia, N. America.—I cannot escape the conviction that this totally different-looking plant, with very different spikelets perigynia and stigmas, is an alpine form of *C. vesicaria*, to which var. *Grahami* forms a passage. I accept Boott's authority for its being the true *saxatilis* of Linn., from the testimony of both Linnæus' *Herbarium*, and of his pupil Solander (in *Herb. Banks*). The Swedish authorities, however, refer *saxatilis* to *rigida*.

55. **C. ampulla'cea**, *Good.*; stout, leaves involute glaucous, female spikelets stout cylindric pale, perigynia spreading ovoid inflated ribbed exceeding the obovate-lanceolate scarious-tipped glumes, beak very slender 2-cuspidate smooth.

Marshes and bogs, ascending to 2,700 ft. in the Highlands; fl. June.—*Rootstock* tufted and creeping. *Stem* 1–2 ft., 3-gonous, smooth, angles obtuse. *Male spikelets* 2–3, slender, sometimes fem. at the base; *female* 2–4, 1–2½ in., sessile or pedicelled, inclined, often squarrose, dense-flowered; bracts overtopping the stem, sheath 0. *Glumes* much as in *C. vesicaria*, and perigynia similar and shining, but much smaller, yellow-brown, ⅛–¼ in., as broad as long, 3-quetrous, horizontal or deflexed when ripe, abruptly contracted into the long beak. *Fruit* obovoid, yellow.—DISTRIB. Europe (Arctic), Siberia, Himalaya, N. America.

56. **C. Pseudo-cype'rus**, *L.*; stout, leaves broad, male-spikelets solitary, female very long-pedicelled drooping cylindric, perigynia stipitate spreading elliptic-lanceolate ribbed green equalling the narrow awned glumes, beak very long smooth 2-cuspidate.

Banks of rivers, lakes, &c. from York and Lancaster southwards to Kent and Devon; local and rare in Ireland; fl. June.—*Rootstock* tufted. *Stems* 1–3 ft., 3-quetrous, scabrid. *Leaves* ¼–½ in. broad, flat, scabrid. *Spikelets* towards the top of the stem; *male* slender, 2–3 in., pale, often female at the top; *female* 4–5, 2–3 in., subsquarrose, pale green; pedicels capillary curved sometimes 4 in.; bracts overtopping the stem, very broad, sheath 0. *Glumes* small, lanceolate or subulate, awn serrate. *Perigynia* ⅛ in., slender, horizontal or deflexed, 3-gonous, shining, ribs many close; beak rigid, pungent, deeply split. *Fruit* pale, 3-gonous, style persistent.—DISTRIB. Europe, Temp. N. and S. Africa, Asia, America, Australia.

57. **C. paludo'sa**, *Good.*; tall, stout, leaves broad glaucous, male spikelets stout, anthers mucronate, female erect dark cylindric, perigynia ovoid ribbed exceeding the lanceolate awned glumes, beak short 2-toothed.

River-banks and ditches, from Ross southwards; ascending to 1,200 ft. in Northumberland; E. and N.E. of Ireland, rare and local; fl. May–June.—*Rootstock* creeping, stoloniferous. *Stems* 2–3 ft., 3-quetrous, scabrid. *Leaves* erect, ¼–½ in. broad, flat, sheath-edges filamentous. *Bracts* erect, long, broad. *Spikelets* rather close; *males* 2–3, 1½–2 in., dark brown, sometimes fem. at the base; *female* shortly pedicelled. *Glumes* of male fl. obtuse, brown with hyaline tips, upper cuspidate; of fem. cuspidate or with a serrulate awn (*C. Kochiana*, DC.). *Perigynia* 3-gonous, gradually narrowed into the beak, angles acute, upper part granulate. *Fruit* lenticular or 3-

quetrous.—DISTRIB. Europe, N. Africa, W. Siberia, N.W. India, N. America. —Stigmas rarely 2.

58. **C. ripa'ria**, *Curtis;* tall, stout, leaves very broad, male spikelets stout, anthers cuspidate, female long stout cylindric, perigynia ovoid ribbed, a little exceeding the ovate-oblong cuspidate glumes, beak short 2-toothed. River-banks and ditches, from Banff and Dumbarton southwards; local in Ireland; fl. May.—Much the largest British species, 3–5 ft. *Rootstock* creeping and tufted. *Stem* 2–5 ft., 3-quetrous, scabrid. *Leaves* flat, ½ in. broad and upwards, sheath-edges filamentous. *Bract* broad, overtopping the stem. *Spikelets* very large; *male* 3–6, crowded, 1½–2 in., ½ in. diam., dark brown, acute, sometimes fem. at the base, mucro of anthers longer than in *C. paludosa; female* 4–6, 2–3 in., pedicelled, inclined, sometimes compound at the base or male at the top. *Glumes* narrow, margins brown, midrib green, tip scabrid; of male slender, acute. *Perigynia* ¼ in., erecto-patent, dull green, narrowed into the beak; ribs many, close. *Fruit* elliptic, 3-quetrous, yellow.—DISTRIB. Europe, N. Africa, Siberia, N. America, Chili, Brazil.—This and the preceding are allied to *C. aquatilis.*

ORDER XV. GRAMIN'EÆ.

Herbs usually tufted and slender. *Stem* cylindric or compressed, jointed, usually hollow between the joints. *Leaves* alternate, narrow; sheath split to the base, with often a transverse membrane (ligule) or ring of hairs at its mouth. *Spikelets* in terminal spikes, racemes, or panicles, usually composed of one pair of flowerless (empty) glumes, enclosing or subtending one or more sessile or stalked normally flower-bearing (but sometimes also empty) glumes, which are distichously arranged on a slender axis. *Flowering glume* terete or laterally compressed, enclosing a 1–2-sexual flower, and a flat often 2-nerved scale (*palea*) with inflexed edges. *Perianth* of 2 (rarely 0 or 3 or more) minute scales, placed opposite the palea. *Stamens* 3 (rarely 1, 2, 6, or more), filaments capillary; anthers 2-celled, versatile, pendulous. *Ovary* 1-celled, styles usually 2, either long with hairy or short with feathery stigmas; ovule 1, basal, erect, anatropous. *Fruit* a membranous utricle, often adherent to the palea, and sometimes to the flowering glume. *Seed* usually adnate to the pericarp, testa membranous, albumen hard floury; embryo minute, on one side of the base of the albumen, suborbicular.—DISTRIB. All climates; genera 250; species about 4,500.—AFFINITIES. With *Cyperaceæ*, and distant with *Palmeæ.*—PROPERTIES. Nutritious herbage, and farinaceous seed; stems and leaves useful for various textile and other purposes.

The reduced and often complex inflorescence of grasses renders an intelligible arrangement of them very difficult. In the following I have been very much guided by the views of General Munro, F.L.S., as given by him in Harvey's "Genera of Cape Plants," the only deviation being in the extension of the tribe *Phalaridæ:* this General Munro would confine to *Phalaris* and *Anthoxanthum*, referring *Nardus* to *Hordeaceæ; Spartina* to *Chlorideæ; Chamagrostis, Alopecurus*, and *Phleum* to *Agrostideæ; Hierochloe* to *Avenaceæ;* and *Sesleria* to *Poaceæ;* but besides the other

affinities of these plants, the nature of their styles and stigmas appears to remove them from the great tribe of *Poaceæ*.

SERIES I. CLISAN'THEÆ, *Fries.* *Spikelets* closed in flower. *Styles* usually elongate, stigmas slender, with short or long simple hairs, protruded at the top of the fl. glume.

TRIBE I. **PANICE'Æ.** *Spikelets* dorsally compressed, articulate below *the lowest glume, hence* wholly dociduous. *Lowest empty glume* small *or 0; 2d larger; 3d glume with a palea and male fl. or 0; 4th with a palea and 2-sexual flower, hardening round the fruit.*

Spikelets with soft hairs on the pedicels or 0.....1. Panicum.
Spikelets with stiff bristles on the pedicels .....2. Setaria.

TRIBE II. **PHALARIDE'Æ.** *Spikelets* laterally rarely dorsally compressed, usually articulate above the 2 empty glumes, which are hence persistent. *Empty glumes* large (0 in *Nardus*).

* *Spikelets* 1-*fld.*; *with no rudiment of a 2d fl. glume.*

Spikelets in 1 unilateral spike; empty glumes 0 .....3. Nardus.
Spikelets in 2 or more unilateral spikes; empty glumes 2.....4. Spartina.
Spikelets in 1 sub-distichous spike; empty glumes 2.....5. Chamagrostis.
Spikelets in a cylindric close panicle; palea 1.....6. Phleum.
Spikelets in a cylindric close panicle; palea 0.....7. Alopecurus.

** *Spikelets* 1–3-*fld.*; *upper fl. alone 2-sexual.*

Fl. glumes 3, upper 2-sexual, 2 lower rudimentary .....8. Phalaris.
Fl. glumes 3, upper 2-sexual, 2 lower large empty .....9. Anthoxanthum.
Fl. glumes 3, upper 2-sexual diandrous, 2 lower male .....10. Hierochloe.

*** *Spikelets* 3 *fld., upper fl. imperfect*.....11. Sesleria.

SERIES II. EURYANTH'EÆ, *Fries.* *Spikelets* open in flower. *Styles* usually short or 0, stigmas long or short with long spreading hairs (feathery), protruded at the sides or base of the fl. glume.

TRIBE III. **POA'CEÆ.** *Spikelets* 1- or more-flowered, articulate above the empty glumes, which are hence persistent (except *Holcus*). *Lowest* or all the flowering glumes 2-sexual (except in *Phragmites* and *Avena* § *Arrhenatherum*), upper often male or rudimentary or reduced to a pedicel at the back of the palea.

SUB-TRIBE **Agrostide'æ.** *Spikelets* 1-fld., with sometimes a rudimentary upper glume. *Empty glumes* 2, conspicuous. *Fl. glumes* often awned.

* *Fl. glumes with few or no basal hairs.*

Empty glumes membranous, awnless; fl. membranous .....12. Agrostis.
Empty glumes coriaceous, awnless; fl. hard .....13. Milium.
Empty glumes membranous with simple awns.....14. Polypogon.
Empty glumes membranous with feathery points .....15. Lagurus.
Empty and fl. glumes rigid, coriaceous, awnless.....16. Psamma.

** *Fl. glumes enveloped in silky hairs.*

Hairs longer or shorter than the glumes.....17. Calamagrostis.

SUB-TRIBE **Oryze'æ.** *Spikelets* 1-fld. Empty glumes 0 or rudimentary. *Awn* if present never twisted.

Fruit adnate to the rigid flowering glume and pale.....18. Leersia.

SUB-TRIBE **Chloride'æ.** *Spikelets* 1-fld., on the under side of a flat unjointed rachis (spike). *Awn* if present not twisted.

Spikes digitate, spikelets minute.....19. Cynodon.

SUB-TRIBE **Avena'ceæ.** *Spikelets* 2–3-fld., racemed or panicled, axis slender; lowest or all the flowers 2-sexual (except *Avena* and *Arrhenatherum*). *Empty glumes* 2, large, usually much exceeding the flowering. *Awn* when present usually dorsal, bent, and twisted.

Fl. glumes (small) usually 2, awned, both 2-sexual .....20. Aira.
Fl. glumes (large) usually 3 or more, awned .....21. Avena.
Fl. glumes (small) 2, awned, upper male.....22. Holcus.
Fl. glumes (small) 3–5, notched or 3-toothed, not awned .....23. Triodia.

SUB-TRIBE **Festu'ceæ.** *Spikelets* racemed or panicled, rarely spiked, 2-many-fld. (rarely 1-fld.), axis usually produced beyond the upper palea. *Empty glumes* usually shorter than the flowering. Lowest flowers or all 2-sexual (except *Phragmites*).

A. Fruit not adherent to the palea.

1. Axis of spikelet bearded with long silky hairs.

Lower flower in each spikelet male .....24. Phragmites.

2. Axis of spikelet webbed or glabrous, not bearded.

α. One or both empty glumes 5- or more-nerved .....25. Melica.

β. Empty glumes never more than 3-nerved.

* *Fl. glumes acute; nerves 0 or converging to the tip.*

Panicle dense, subunilateral. Spikelets compressed .....26. Dactylis.
Panicle contracted, spikelike. Spikelets compressed .....27. Koeleria.
Panicle open. Spikelets terete, conical, coriaceous. .....28. Molinia.

** *Fl. glumes obtuse or acute; nerves parallel.*

Fl. glumes compressed, keeled, acute, 5-nerved.....29. Poa.
Fl. glumes cuneate, convex, 5-nerved, tip torn .....30. Catabrosa.
Fl. glumes convex, 5–7-nerved, tip acute or obtuse .....31. Glyceria.

B. Fruit adherent to the palea.

* *Spikelets all similar, fertile.*

Fl. glumes horizontal, inflated, obtuse .....32. Briza.
Fl. glumes compressed or terete, acute, few-nerved.....33. Festuca.
Fl. glumes compressed or terete, acute, 5–9-nerved .....34. Bromus.
** *Outer spikelet of each fascicle deformed, pectinate*.....35. Cynosurus.

SUB-TRIBE **Hordea'ceæ.** *Spikelets* 1-many-fld., solitary or 1–3-nate, sessile or subsessile on opposite (rarely on one) sides of a simple rachis; outer when 3-nate sometimes reduced to a pair of bristle-like glumes. *Empty glumes* 1–2; awn straight not twisted or 0.

* *Spike distichous; spikelets solitary.*

Empty glumes 2, unequal; fl. glumes many .....36. Brachypodium.
Empty glumes 2, equal; fl. glumes 2 or more .....37. Triticum.
Empty glume 1; fl. glumes many.....38. Lolium.
Empty glumes 2, both facing the rachis; fl. glumes 1–2 ...39. Lepturus.

** *Spike distichous; spikelets 2–3-nate.*

Fl. glumes 2 or more in each spikelet.....40. Elymus.
Fl. glumes 1 or 0 in the lateral spikelets .....41. Hordeum.

1. PAN'ICUM, *L.*

Spikelets without bristles at the base, or with slender hairs only, spiked racemed or panicled, 1-fld., or if 2-fld. the lower male. *Empty glumes* 2 in the 2-fld. spikelets, 3 in the 1-fld.; lowest small or minute, 2d larger,

strongly nerved. *Fl. glume* nerved, hardening and enclosing the palea and fruit. *Scales* 2, fleshy, truncate. *Stamens* 3. *Ovary* glabrous; stigmas penicillate, shorter than the style. *Fruit* compressed or plano-convex. —DISTRIB. Chiefly tropical; species 500.—ETYM. The Latin name.

SUB-GEN. 1. **Digitar'ia,** Scop. (gen.). *Spikelets* unilateral, on digitate spikes. *Flowering glume* not awned.

1. **P. gla'brum,** *Gaud.*; spikes about 3, spikelets 1-fld. *Digitaria humifusa,* Pers.

Sandy soil in the S.E. counties, from Norfolk to Hampshire, local; a native or colonist, *Watson;* fl. July–Aug.—Annual. *Root* fibrous. *Stems* 6–12 in., prostrate or decumbent. *Leaves* narrow, flat; sheaths flat, mouth hairy; ligule short. *Spikes* 2–3 in., flexuous, channelled on the face. *Spikelets* $\frac{1}{12}$ in., in pedicelled pairs, plano-convex, elliptic, purplish; empty glumes hairy, lower minute appressed or 0.—DISTRIB. Most warm climates.

SUB-GEN. 2. **Echinochlo'a,** *Beauv.* (gen.). *Spikelets* in racemes or panicles. *Flowering glume* awned or pointed.

P. CRUS-GAL'LI, *L.*; spikelets panicled 1-fld.

Fields and waste places in the S.E. of England; naturalized; fl. July.—Annual. *Stems* 1–4 ft., stout, ascending. *Leaves* $\frac{1}{2}$ in. diam., flat, glabrous; edges rough, often waved; ligule 0. *Panicle* 3–6 in.; branches subunilateral; rachis 3-quetrous, pubescent; pedicel hairy. *Spikelets* $\frac{1}{8}$ in., plano-convex, greenish; upper empty glume hispid, pointed or rigidly awned; fl. glume polished.—DISTRIB. All temp. and trop. regions.

2. SETAR'IA, *Beauv.*

Spikelets in a dense cylindric spikelike panicle, as in *Panicum,* but awnless, and with stout rough bristles at the base on one side.—DISTRIB. All warm and trop. regions; species 20.—ETYM. *seta,* a *bristle.*

1. **S. vir'idis,** *Beauv.*; bristles clustered scabrid.

Cultivated fields in Norfolk, Suffolk, and Surrey; a colonist or native, *Watson;* fl. July–Aug.—Annual. *Stems* suberect, scabrulous above. *Leaves* flat, smooth, edges rough; sheaths smooth, edges ciliate; mouth with a ring of hairs. *Panicle* 1–3 in., green; branches whorled, hispid, 3-quetrous; bristles $\frac{1}{4}$–$\frac{1}{3}$ in., flexuous, purplish. *Spikelets* $\frac{1}{7}$ in., elliptic, obtuse; empty glumes membranous; fl. glumes shining, punctulate, striate.—DISTRIB. All warm climates; introd. in America.

S. VERTICILLA'TA, *Beauv.*; bristles single or in pairs barbed.

Cultivated fields, Norwich, Surrey, and Middlesex; fl. July–Aug.—Habit of *S. viridis,* but panicle usually narrower, and the bristles truly barbed, their asperities pointing downwards.—DISTRIB. As of *S. viridis.*

3. NAR'DUS, *L.* MAT-WEED.

Spikelets solitary, sessile, secund, in a simple unilateral spike, placed obliquely and in excavations of the slender rachis, 1-fld. *Empty glumes* 0. *Fl. glume* 1, slender, concave, keeled, shortly awned, persistent. *Palea* linear, entire, 2-keeled. *Scales* 0. *Stamens* 3. *Ovary* narrow, glabrous, contracted into a slender style, stigma filiform hairy

persistent. *Fruit* adherent to the palea.—DISTRIB. Europe (Arctic), Azores, Greenland; the only species.—ETYM. Obscure.

1. **N. stric'ta,** *L.*; glabrous, perennial, leaves setaceous.

Heaths and dry pastures; ascending to 3,300 ft. in the Highlands; fl. June-July.—*Rootstock* stout, creeping, densely tufted. *Stems* 2-8 in., erect, filiform, rigid, striate, angled; base with long pale sheaths. *Leaves* channelled, scaberulous, upper erect, lower divaricate, almost horizontal; sheaths smooth; ligule short. *Spike* 1-3 in., solitary; rachis very slender, strict. *Spikelets* rather distant; fl. glume ½ in., slender, reddish or purplish, divaricate after flowering, scabrid above, narrowed into the short awn. —Rejected by sheep, on account of the harsh divaricate foliage.

4. SPARTI'NA, *Schreber.*

Spikelets long, laterally compressed, subsessile in 2 ranks on one-sided panicled erect 3-gonous spikes, 1-fld., with sometimes a rudiment of a 2d at the base of the palea.. *Empty glumes* 2, narrow, subequal, pointed or awned; upper 5-nerved, exceeding the flowering; lower smaller. *Fl. glume* sessile, coriaceous, edges membranous, awnless, 1-nerved, not exceeding the 2-nerved palea. *Scales* 0. *Stamens* 3. *Ovary* glabrous; styles long, connate below, stigmas long hairy. *Fruit* laterally compressed, enveloped in the palea and fl. glume.—DISTRIB. Chiefly warm climates; species 8.—ETYM. *σπαρτίνη*, a *cord*, from the use of the leaves.

1. **S. stric'ta,** *Roth.*; point of rachis of spike subulate.

Muddy salt creeks and marshes, Lincoln, and from Devon to Kent; rare; fl. July-Aug.—*Rootstock* long, branched, extensively creeping. *Stems* 1-3 ft., erect, strict, stout, polished, leafy throughout. *Leaves* ⅛-⅓ in. broad, strict, erect, coriaceous, convolute, smooth, pungent, glaucous above; ligule short, silky. *Panicle* 3-8 in., strict; spikes 3-8, 1-3 in.; rachis angled, smooth, point equalling or twice as long as the upper spikelet; pedicel very short. *Spikelets* ½-⅔ in., imbricate, yellowish green; empty glumes acute, lowest acuminate, upper 2-toothed and tipped with a stiff awn, a little silky; keel somewhat scabrid.—DISTRIB. W. Europe from Belgium and Spain to Austria and Italy, N. America.

Sub-sp. STRIC'TA proper; stem 1½-2 ft., lower leaves deciduous from the sheath, spikes 2-4, tip of rachis equalling the upper spikelet.

Sub-sp. ALTERNIFLO'RA, *Loisel.* (sp.); stem 2-4 ft., leaves persistent, spikes 3-8, tip of rachis exceeding the upper spikelet.—Southampton.

5. CHAMAGROS'TIS, *Borkh.*

A minute annual. *Spikelets* laterally or distichously arranged in a simple slender flexuous rachis, dorsally compressed, very shortly pedicelled, 1-fld. *Empty glumes* 2, a little exceeding the flowering, broad, subequal, concave, not keeled, truncate, awnless, membranous, 1-nerved, upper next the rachis. *Fl. glume* hyaline, very hairy, truncate, 5-nerved. *Palea* 2-nerved or 0. *Scales* 2, very minute. *Stamens* 3; anthers short. *Ovary* glabrous; styles 2, very long, stigmas slender hairy. *Fruit* obovoid, compressed, embraced by the fl. glume and palea.—DISTRIB. W. Europe from Hanover to Spain and Italy, N. Africa.—ETYM. *χαμαί* and *ἀγρόστις*, from its lowly habit.

1. **C. min'ima,** *Borkh.*; stems capillary. *Sturmia minima,* Hoppe; *Mibora verna,* Adans.; *Knappia agrostidea,* Sm.

Wet sands, especially near the sea, Anglesea and Jersey; formerly in Essex; naturalized in Haddington; fl. March–April.—*Stems* 1–3 in., tufted. *Leaves* short, strict, scaberulous, obtuse, setaceous, margins involute; sheaths white, inflated; ligule short. *Spike* ½–1 in. *Spikelets* very minute.

6. PHLE'UM, *L.* CAT'S-TAIL GRASS.

Spikelets in spikelike panicles, 1-fld., with rarely a rudimentary 2d. *Empty glumes* exceeding the flowering, equal, much laterally compressed, keeled, awned, or mucronate. *Fl. glume* awned or not, 3–5-nerved, toothed. *Palea* small. *Scales* 2, hyaline, toothed on the outer margins. *Stamens* 3. *Ovary* glabrous; styles long, stigmas slender, hairy. *Fruit* compressed, enclosed in the fl. glume and palea.—DISTRIB. N. and S. temp. and Arctic regions; species 10.—ETYM. The old Greek name.

* *Empty glumes truncate, tip scarious. Fl. glume* 3-*nerved.*

1. **P. praten'se,** *L.*; leaf-sheaths appressed, panicle cylindric, keel of empty glumes hispid, awn rigid ⅓ their length. *Timothy-grass.*

Pastures, &c., ascending to nearly 1,400 ft. in the N. of England; fl. June–Aug.—Perennial. *Stem* 6–18 in., tuberous at the base, tufted, ascending, smooth. *Leaves* short, flat; ligule long. *Panicle* 1–6 in., obtuse, green. *Spikelets* crowded, shortly pedicelled; empty glumes with the awns ⅛ in.; keel green, stout, ciliate with stiff setæ, sides pale; awns scabrid, rigid; fl. glumes membranous, cuspidate; anthers oblong.—DISTRIB. Europe, N. Africa, Siberia, W. Asia; introd. in N. America.—An excellent fodder.

2. **P. alpi'num,** *L.*; upper sheaths inflated, panicle ovoid or oblong, empty glumes equalling their rigid awn, keel hispid.

Edges of alpine springs and rills; Perth, Forfar and Aberdeen, from 2,100 to 3,600 ft.; fl. July.—Perennial. *Stem* 6-18 in., solitary, creeping below, smooth, ascending, rigid. *Leaves* short, flat, spreading; lower sheaths appressed; ligule short. *Panicle* ½–1¼ in., dull purple and green. *Empty glumes* as in *P. pratense,* but larger, ⅛ in. including the awn.—DISTRIB. Arctic and Alpine Europe, N. and W. Asia to the Himalaya, N. America, Fuegia.

** *Empty glumes gradually pointed; fl. glume* 3-*nerved, with the pedicel of a* 2*d at its base.*

3. **P. arena'rium,** *L.*; upper sheaths inflated, panicle cylindric-oblong narrowed at the base, empty glumes hardly awned, keel ciliate above.

Sandy dunes, &c. on the E. and S. coasts, from Aberdeen to Kent and Cornwall, local; and in Ireland; fl. May–June.—Annual, glabrous. *Stems* 2–6 in., crowded, leafy. *Leaves* broad, flat; sheaths smooth; ligule long. *Panicle* ½–1 in., most contracted at the base, glaucous. *Spikelets* ⅛ in., crowded; empty glumes lanceolate, acuminate, punctulate; fl. glume very small, hairy; anthers minute, short, yellow.—DISTRIB. Europe, W. Africa.

4. **P. Bœhmer'i,** *Wibel;* sheaths hardly inflated, panicle cylindric long, keel of shortly awned empty glumes almost smooth or ciliate.

Sandy and chalky fields in Norfolk, Suffolk, Cambridge, Essex, and Herts; fl. July.—Annual, glabrous. *Stems* 10–18 in., ascending, smooth. *Leaves* short, flat, scabrid, rather glaucous; upper ligules long. *Panicle* 2–4 in., rather narrow, obtuse, green, slightly interrupted. *Spikelets,* ⅛ in.,

fascicled; empty glumes linear-oblong, obliquely truncate below the short rigid subulate awn, very coriaceous, green; margins white, punctulate; *fl. glume* minute; anthers linear-oblong.—DISTRIB. Europe, Siberia, Dahuria.

7. ALOPECU'RUS, *L.* FOX-TAIL GRASS.

Spikelets much laterally compressed, in spikelike cylindric panicles, 1-fld. *Empty glumes* subequal, often connate below, awnless, a little exceeding the flowering. *Fl. glume* hyaline, 1-nerved, convolute, edges connate at the base; awn bent, inserted at the middle of the back. *Palea* 0 (in British species). *Scales* 0. *Stamens* 3. *Ovary* glabrous; styles connate, stigmas with short simple hairs. *Fruit* laterally compressed, enclosed in the palea.—DISTRIB. N. and S. temp. and cold regions; species 14.—ETYM. ἀλώπηξ and οὐρά, *fox-tail.*

* *Empty glumes connate to or nearly to the middle.*

1. **A. agres'tis,** *L.*; panicle acute, keel of subglabrous glumes narrowly winged shortly ciliate, awn twice as long as the fl. glume.

Fields and roadsides, common in England; rare and hardly indigenous in Scotland; not a native of Ireland; a colonist, *Watson;* fl. May–Oct.—Annual, scaberulous. *Stem* 1–2 ft., lowest joint prostrate. *Leaves* flat, edges rough; sheath smooth; ligule large, truncate. *Panicle* 2–3 in., slender, often purplish, flexuous; branches very short, piloso, with 2 spikelets. *Empty glumes* ¼ in., lanceolate, pale, connate to the middle, acute, incurved; fl. glume a little exserted, glabrous.—DISTRIB. Europe, N. Africa, Siberia; introd. in N. America.—A troublesome weed.

2. **A. alpi'nus,** *Sm.*; panicle short ovoid obtuse, keel of acute silky empty glumes silkily ciliate, awn very short.

Springs and edges of streams in the Alps of Ross, Aberdeen, Forfar, and Inverness, 2,100 to 3,600 ft.; fl. July–Aug.—Perennial. *Stem* creeping below, then erect, 6–18 in., rather stout, smooth, contracted at the top. *Leaves* short, broad, flat; sheaths inflated, upper much longer than its leaf; ligule short, obtuse. *Panicle* ½–¾ in., ⅓–½ in. broad, dense; branches with 4–6 spikelets, short, silky. *Empty glumes* ⅛ in., ovate, very silky, shining; fl. glume glabrous, obtuse; awn variable, from the middle of the palea, rarely 0; anthers linear, yellow.—DISTRIB. Spitzbergen, Arctic Siberia, Greenland, America, Fuegia.

** *Empty glumes free or connate towards the base.*

3. **A. praten'sis,** *L.*; panicle slender cylindric obtuse, keel of pilose acute empty glumes villously ciliate, awn twice as long as the fl. glume.

Meadows and pastures, ascending to nearly 2,000 ft. in the N. of England; fl. May–June.—Perennial, stoloniferous. *Stems* 1–3 ft., erect or lowest joint inclined, smooth. *Leaves* scaberulous, flat; sheath smooth, upper inflated, longer than its leaf; ligule large, truncate. *Panicle* 1½–2½ in., dense, soft, pale green; branches very short, with 3–6 spikelets. *Empty glumes* ⅛ in., ovate-lanceolate, acute; fl. glume subacute, glabrous, ciliate, margins connate ⅓–½ of its length.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, W. Asia to N.W. India; introd. in America.—*A. pronus,* Mitten, is a prostrate state. Babington states that the stems are tuberous at the base in salt marshes. An excellent fodder.

4. **A. bulbo'sus,** *L.*; stem smooth base tuberous, panicle slender

cylindric subacute, keel of pilose acute empty glumes shortly ciliate, awn twice as long as the fl. glume.

Salt marshes from York and Chester to Devon and Kent, rare; absent from Ireland; fl. May–July.—Perennial, glabrous. *Stem* 8–16 in., slender, curved or bent below, smooth or slightly scabrid above; tuberous base narrow-ovoid, ¼–¾ in. long. *Panicle* 1–2½ in., very slender, dense, pale-green; branches with 1 spikelet and sometimes a 2d imperfect one. *Empty glumes* ⅛–¼ in., acuminate, exceeding the palea, margins free to the base.—DISTRIB. W. Europe, N. Germany, France to Spain and Italy.

5. **A. geniculatus,** *L.*; panicle cylindric obtuse, keel of pilose obtuse empty glumes villously ciliate, awn almost twice as long as the fl. glume.

Wet meadows and ditches, ascending to nearly 2,000 ft. in the N. of England; fl. May–Aug.—Perennial, glabrous. *Root* fibrous. *Stem* 8–18 in., procumbent and rooting below. *Leaves* flat, scaberulous above and on the edges. *Panicle* 1–1½ in., slender, dense-fld.; branches with 1 spikelet. *Empty glumes* connate at the very base, hairy and silky as in *A. pratensis*, but smaller, ⅛ in., obtuse; awn shorter and more basal; anthers purplish, linear.—DISTRIB. Europe, N. Africa, Siberia, Dahuria, W. Asia to India; introd. in N. America.

6. **A. fulvus,** *Sm.*; panicle cylindric obtuse, keel of pilose obtuse glumes villously ciliate, awn a little exceeding the glume.

Wet meadows and ditches from Denbigh, Norfolk, and Leicester to Wilts and Surrey; fl. July.—Habit of *A. geniculatus*, but glaucous; sheaths more inflated; leaves broader; panicle longer, often 2 in., paler; glumes ⅛ in. (the smallest of the British species), very obtuse; awn very short, inserted near the middle; anthers shorter, yellow, oblong.—DISTRIB. Europe, Siberia.

8. PHAL'ARIS, *L.*

Spikelets much laterally compressed, in loose or spikelike panicles, 1-fld. with 2 or more rudimentary glumes (scales or pedicels) beneath it on one side. *Empty glumes* 2, enclosing the flowering, subequal, keeled. *Fl. glume* broad. *Palea* much smaller. *Scales* 2, minute. *Stamens* 3. *Ovary* glabrous; styles long, connate below, stigmas slender hairy. *Fruit* compressed, enclosed in the coriaceous glume and palea.—DISTRIB. Trop. and temp. regions; species 16.—ETYM. The old name.

SUB-GEN. 1. **Phal'aris** proper. *Panicle* spikelike. *Empty glumes* broadly-winged.

P. CANARIEN'SIS, *L.*; panicle ovoid. *Canary Grass.*

Fields and waste places, naturalized; fl. July.—Annual, glaucous. *Root* fibrous. *Stems* 1–3 ft., erect, scaberulous. *Leaves* flat, upper sheaths inflated; ligule large. *Panicle* 1–1½ in., ovoid or suboylindric, compact, pale green. *Spikelets* nearly ¼ in. diam., orbicular; empty glumes membranous, acute, wings broad, keel green, nerves 2, stout; fl. glume much shorter, silky, obscurely nerved, with 2 lanceolate acute scales at its base.—DISTRIB. Warm and temp. climates, Europe, N. Africa, W. Asia; introd. in America.

SUB-GEN. 2. **Digra'phis,** *Trin.* (gen.). *Panicle* contracted, interrupted. *Empty glumes* hardly winged.

1. **P. arundina'cea,** *L.*; panicle elongate, branches short.

Rivers, lakes, &c., ascending to nearly 1,400 ft. in the N. of England; fl. July–Aug.—Perennial, glabrous. *Rootstock* creeping. *Stems* 2–6 ft., stout, erect. *Leaves* ½–¾ in: broad, flat; sheaths smooth; ligule large. *Panicle* 4–8 in., suberect; branches scabrid, spreading only when flowering. *Spikelets* ¼ in., ovate, often purplish; empty glumes 3-nerved, acuminate, glabrous; fl. glume rather shorter, ovate-lanceolate, nerveless, silky, with 2 narrow silky scales at its base.—DISTRIB. N. temp. and Arctic regions.

9. ANTHOXAN'THUM, *L.* VERNAL GRASS.

Sweet-scented. *Spikelets* in a spikelike panicle, 1-fld. with a large 2-fid awned glume on each side of the flowering one. *Empty glumes* 2, much exceeding the flowering, very unequal, membranous; lower smaller, 1-nerved; upper 3-nerved. *Fl. glume* glabrous, obtuse, awnless. *Palea* 1-nerved. *Scales* 0. *Stamens* 2; anthers large, linear, yellow. *Ovary* glabrous; styles long, stigmas feathery. *Fruit* terete, acute, enclosed in the brown shining fl. glume and palea.—DISTRIB. N. temp. and cold regions of the Old World; species 3.—ETYM. *ἄνθος* and *ξανθός*, from the *yellow anthers*.

1. **A. odora'tum,** *L.*; panicle interrupted below.

Meadows, woods, and banks, ascending to nearly 3,400 ft. in the Highlands; fl. May–June.—Perennial. *Stem* 6–18 in., shining. *Leaves* flat, hairy; sheaths furrowed, often pubescent, mouth pilose. *Panicle* 1–5 in., pubescent or villous; branches short. *Spikelets* ¼–⅓ in., fascicled, often squarrose, green; empty glumes ovate, acute, upper lanceolate, almost awned; two succeeding glumes 2-lobed, pilose, awn in the sinus slender exserted; fl. glume smaller.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria, Greenland; introd. in N. America.—Odour of Woodruff.

10. HIEROCHLO'E, *Gmelin.* HOLY GRASS.

Spikelets laterally compressed, panicled, 3-fld.; upper flower 2-sexual 2-androus; 2 lower male, 3-androus. *Empty glumes* subequal, about equalling the flowering, membranous, keeled, 3-nerved. *Fl. glumes* pedicelled, 5-nerved, awned or not. *Palea* of the 2-sexual fl. keeled, 1-nerved; of the male fl. 2-nerved. *Scales* lanceolate. *Stamens* 2–3. *Ovary* glabrous, styles long, stigmas hairy. *Fruit* terete, free.—DISTRIB. Arctic and cold regions; species 10.—ETYM. *ἱερός* and *χλόα*, *sacred grass*, from its being formerly strewed on church floors.

1. **H. borea'lis,** *R. and S.*; fl. glumes shortly awned near the tip.

Wet banks, Thurso, and formerly in Forfarshire; fl. May–June.—*Rootstock* creeping. *Stems* 10–18 in., tufted, smooth, glabrous. *Leaves* flat, acute, edges scabrid; sheaths smooth; ligule long. *Panicle* pyramidal, subunilateral, sparingly branched, pedicels smooth. *Spikelets* ¼ in. broad, ovate, fulvous or brown, shining; empty glumes membranous, translucent, acute, toothed, mucronate; fl. glumes similar, of the male fl. hispid, ciliate; of the 2-sexual fl. hairy above.—DISTRIB. Arctic, Alpine, and N. Europe, N. and W. Asia, N. America.

11. SESLE'RIA, *Scop.*

Spikelets compressed, in a contracted dense subcapitate bracteate panicle, 1–2-fld.; bracts small, entire, toothed or multifid, sheathing the lower

peduncles. *Empty glumes* 2, longer than the flowering, subequal, 1- rarely 3-nerved. *Fl. glumes* 2–3, the upper rudimentary, keeled, 3-cuspidate, 5-nerved. *Palea* 2-keeled. *Scales* 2, 3–5-toothed. *Stamens* 3. *Ovary* hairy at the top; styles terminal, connate below, stigmas very long hairy. *Fruit* slightly compressed, free.—DISTRIB. Europe, N. Africa, W. Asia; species 8.—ETYM. *L. Sesler*, an Italian botanist.

1. **S. cæru'lea,** *Scop.*; panicle oblong subsecund silvery-grey.

Hilly pastures, especially in limestone districts, from Ross to York and Westmoreland; ascending to 2,500 ft. in the Highlands; W. of Ireland, local; fl. April–June.—Perennial. *Root* fibrous. *Stems* 6–18 in., erect, smooth. *Leaves* narrow, flat, glaucous above, tip scabrid mucronate, glabrous or pilose, upper very short; sheaths compressed, breaking up into fibres; ligule short, ciliate. *Panicle* ½–1 in., blue-grey, glistening. *Spikelets* $\frac{1}{10}$ in., in subsessile fascicles, the lower embraced at the base by a small convolute bract or glume; empty glumes ciliate, acuminate; fl. glumes pubescent, 3 central nerves confluent; awn very short.—DISTRIB. Europe.

12. AGROS'TIS, *L.* BENT.

Spikelets very small, in an open or contracted panicle, with whorled branches, 1-fld., with or without the pedicel of a 2d (upper fl. glume) at the back of the palea. *Empty glumes* 2, exceeding the flowering, unequal, membranous, awnless, convex, keeled. *Fl. glume* hyaline, awn slender: dorsal or 0. *Palea* 2-nerved or 0. *Scales* glabrous, entire. *Stamens* 3. *Styles* 2, stigmas feathery. *Fruit* free, terete, glabrous.—DISTRIB. All temp. and cold climates; species 60.—ETYM. An old Greek name.

SUB-GEN. 1. **Tricho'dium,** *Michx.* (gen.). *Upper empty glume* smaller than the lower. *Palea* very minute or 0.

1. **A. cani'na,** *L.*; leaves narrow flat smooth.

Moors, heaths, &c.; fl. July–Aug.—Perennial, glabrous, smooth. *Stems* 6–24 in., sometimes stoloniferous. *Leaves* 2–5 in., $\frac{1}{10}$–$\frac{1}{8}$ in. broad; ligule oblong. *Panicle* 2–4 in., slender, flexuous, flowering open, fruiting contracted, purplish or green; branches capillary, scabrid. *Fl. glume* ⅓ shorter than the empty, truncate, with 5 excurrent nerves; awn from above the base, variable in length, bent in the middle.—DISTRIB. Europe (Arctic), Siberia, W. Asia to the Himalaya, N. and S. America, Australia, New Zealand.

2. **A. seta'cea,** *Curt.*; leaves setaceous involute scaberulous.

Dry downs, from Glamorgan and Cornwall to Sussex and Hants; fl. June–July.—Perennial. *Stem* 8–12 in., strict, scaberulous. *Leaves* very many, erect, rigid; ligule oblong. *Panicle* 1½–3½ in., and spikelets much as in *A. canina*, but empty glumes scabrid, almost awned; fl. glume with a longer, rather twisted awn, and 2 minute tufts of hairs at the base; palea minute.—DISTRIB. Belgium, France, and Spain.

SUB-GEN. 2. **Agros'tis** proper. *Empty glumes* subequal, or upper smaller than the lower. *Palea* 2-nerved.

3. **A. vulga'ris,** *With.*; ligule short truncate, fruiting panicle spreading.

Meadows and marshy places; ascending to nearly 3,200 ft. in the Highlands; fl. June–Sept.—Perennial. *Stems* 6–24 in., ascending, smooth. *Leaves* short, flat, scabrid; sheaths smooth. *Panicle* 1–3 in., narrowly ovate, but variable

in form. *Empty glumes* ⅓ in., subequal, ovate or lanceolate, acute, nearly smooth, dull red or purplish and green; fl. glume a little shorter, truncate, 3-nerved, 3 times longer than the palea; awn 0 or short.—DISTRIB. Europe, N. Africa, Himalaya, N. America.

VAR. 1, *vulga'ris* proper; slender, panicle usually elongate, fl. glume rarely awned.—VAR. 2, *pu'mila*, L. (sp.); short, stout, panicle shorter, branches stouter, empty glumes broader, fl. glume usually awned.

4. **A. al'ba,** *L.*; ligule long acute, fruiting panicle contracted. *Fiorin Grass.*

Pastures and waste places; ascending to nearly 1,400 ft. in Yorkshire; fl. July–Sept.—Perennial. *Stems* 6–24 in., with or without stolons, more or less prostrate below, scaberulous above. *Leaves* flat, scabrid or not; sheaths smooth. *Panicle* 1–8 in., branched or lobed, green or yellowish; branches scabrid. *Empty glumes* much as in *A. vulgaris*, but rather larger, more rigid, not so shining; fl. glume 5-nerved, rarely awned.—DISTRIB. Europe (Arctic), N. Africa, Siberia, Dahuria, N. America. *A. stolonifera*, L., is a more stoloniferous state.

SUB-GEN. 3. **Ape'ra,** *Beauv.* (gen.). *Upper empty glume* larger than the lower. *Fl. glume* with the pedicel of a 2d flower at the base, awned.

5. **A. Spica-ven'ti,** *L.*; panicle large pyramidal effuse or contracted, awn much exceeding the fl. glume.

Sandy, often inundated fields, in the E. of England, from Northumberland to Kent and Hants; fl. June–July.—Annual. *Stems* 1–3 ft., densely tufted, stout or slender, erect from a decumbent base, smooth. *Leaves* flat, glabrous or pilose, scabrid below and on the edges; ligule short, torn. *Panicle* 3 in., 1-fld., sometimes 3 in. broad, green or purple; branches many in a whorl, capillary, scabrid. *Empty glumes* ⅛ in., lanceolate, acuminate, membranous, closed in fruit, nearly smooth, shining; fl. glume hairy, awn subterminal, 3 times its length, erect, very slender; palea with 2 tufts of silky hairs at the base.—DISTRIB. Europe, N. Africa, Siberia.

Sub-sp. SPICA-VEN'TI proper; panicle large broad effuse, anthers linear.

Sub-sp. INTERRUP'TA, *L.* (sp.); panicle contracted interrupted, anthers oblong.—Rarer.

SUB-GEN. 4. **Gastrid'ium,** *Beauv.* (gen.). *Panicle* contracted. *Empty glumes* closed, gibbous at the base.

6. **A. austra'lis,** *L.*; glumes lanceolate, awn exserted. *Gastridium lendigerum*, Gaud. *Nit-grass.*

Maritime sandy marshes, &c., from Norfolk S. and W. to Cornwall; a colonist, *Watson;* fl. June–Oct.—Annual. *Stems* 6–10 in., densely tufted, erect or ascending, slender, leafy. *Leaves* short, flat, scaberulous; sheaths smooth; ligule oblong. *Panicle* large, 1–3 in., cylindric-fusiform, dense, pale green, glistening; branches scaberulous; pedicels swollen at the top. *Empty glumes* ⅛ in., erect, lanceolate, very acuminate, the swollen base polished, keel obscurely scabrid; fl. glume minute, white, shining, truncate, 4-toothed; awn near the top, very slender.—DISTRIB. Europe from France Spain and Germany E. to Turkey, Asia Minor, N. Africa.

13. MIL'IUM, *L.* MILLET-GRASS.

Spikelets in an effuse panicle, 1-fld.; branches in ½-whorls. *Empty glumes* 2, equalling the flowering, broad, subequal, obtuse, awnless,

3-nerved. *Fl. glume* shortly pedicelled, rigid, ovate, tumid, convex, obscurely 3-nerved, awnless. *Palea* 2-nerved. *Scales* 2, fleshy, acute, toothed on one side. *Ovary* glabrous; styles short, stigmas feathery. *Fruit* terete, included in the hardened glume and palea.—DISTRIB. Temp. and trop.; species 8.—ETYM. The Latin name for the true *Millet*, misapplied.

1. **M. effu'sum,** *L.*; leaves broad flat thin.

Damp woods from Argyle and Moray southwards; ascending to upwards of 1,000 ft. in the Lake district; rather rare in Ireland; fl. May-June.—Perennial, pale green. *Stems* 2–4 ft., tufted, erect, smooth, shining, leafy. *Leaves* ⅛–½ in. broad, linear-oblong, acute, scabrid above; sheaths smooth; ligule long, truncate, torn. *Panicle* 5–10 in., very lax and slender; branches capillary, spreading or defloxed, in remote whorls, few-fld. *Empty glumes* ⅛ in., elliptic-ovoid, obtuse, scaberulous, edges hyaline; fl. glume quite smooth, white, and polished when ripe.—DISTRIB. Europe (Arctic), Siberia, W. Asia, N. America.

14. POLYPO'GON, *Desf.* BEARD-GRASS.

Spikelets in a contracted or spikelike panicle, 1-fld. *Empty glumes* 2, much exceeding the flowering, equal, concave, keeled, 2-fid or notched, awned in the sinus. *Fl. glume* sessile, hyaline, naked at the base, broad, truncate, toothed, awned near the top. *Palea* small, 2-nerved. *Scales* 2, falcate, entire. *Stamens* 3; anthers small. *Ovary* glabrous; styles long, stigmas feathery. *Fruit* terete, wrapped in the palea.—DISTRIB. Warm and trop. regions; species 12.—ETYM. πολύς and πώγων, from the *many awns.*

1. **P. monspelien'sis,** *Desf.*; annual, awns much exceeding the scabrid deeply-notched glumes, fl. glume not awned.

Damp pastures on the S. E. coast; from Norfolk to Hants, rare; introduced as far north as Fife and W. as Devon; fl. June–July.—Annual. *Stems* ½–4 ft., erect, stout, smooth. *Leaves* large, broad, flat, scabrid; sheaths smooth; ligule large, obtuse. *Panicle* 1–6 in., oblong-ovoid or fusiform, cylindric or lobed, obtuse, pale greenish-yellow, dense, soft. *Empty glumes* nearly ⅛ in., narrow linear; awn straight, 2–3 times as long; fl. glume not ¼ as long as the empty, silvery.—DISTRIB. Europe from Holland southwards, N. Africa, W. Asia to India.

2. **P. littora'lis,** *Sm.*; perennial, awns as long as the nearly smooth acute obscurely notched glumes, fl. glume awned.

Muddy salt marshes from Norfolk to Hants, very rare; fl. July.—Perennial, variable in size. *Stems* 1–6 ft., erect or decumbent, usually more slender below than in *P. monspeliensis;* panicle smaller, more lobed, purplish; empty glumes much smoother, more acute, awns shorter, keel scabrid; fl. glume about ⅓ shorter than the empty; awn exserted.—DISTRIB. W. Europe from France, Belgium, and Germany to Spain.

15. LAGU'RUS, *L.* HARE'S-TAIL GRASS.

A soft, hairy, annual, tufted grass. *Spikelets* in a dense feathery ovoid head, 1-fld., laterally compressed; pedicel not jointed at the top. *Empty glumes* 2, much exceeding the flowering, equal, long, with slender feathery points. *Fl. glume* membranous, shortly stipitate, with the

pedicel of an upper flower at the back of the palea, narrow, terete, with 2 short awns and an intermediate long bent and twisted one at the tip. *Palea* 2-nerved. *Scales* 2, fleshy. *Stamens* 3. *Ovary* glabrous; styles 2, very short, stigmas long feathery. *Fruit* smooth, embraced by the glume and palea.—DISTRIB. W. and S. Europe from Belgium southwards and eastwards, N. Africa, W. Asia.—ETYM. λαγωός and οὐρά, *hare's-tail.*

1. **L. ova'tus,** *L.*; leaves short flat, ligule short.

Sandy places, Guernsey; naturalized near Saffron Walden; fl. June.—*Stems* 6–10 in., very many, erect or decumbent below, stout, pubescent, leafy below. *Leaves* broad, and inflated sheaths pubescent or villous. *Heads* 1–1½ in., ¾ in. broad, white, obtuse. *Empty glumes* ¼ in., very slender; awn twice as long as the nearly glabrous fl. glume.

16. PSAM'MA, *Beauv.* MARREM-GRASS.

Spikelets in a contracted panicle, much laterally compressed, 1-fld., with sometimes the pedicel of an upper glume. *Empty glumes* 2, scarcely exceeding the flowering, rigid, subequal, long, narrow, keeled, subacute. *Fl. glume* rigid, shortly pedicelled, with an oblique callus and a short pencil of silky hairs at the base, 4–5-nerved; awn minute, subterminal. *Palea* equalling the glume, rigid, 2-nerved. *Scales* very acuminate. *Stamens,* ovary, and fruit of *Calamagrostis.*—DISTRIB. Shores of Europe, N. Africa; species 2.—ETYM. ψάμμος, sand.

P. arena'ria, *R. and S.*; panicle subcylindric white. *Ammophila arundinacea,* Host.

Sand-hills and dunes by the sea; fl. July.—*Rootstock* widely creeping, binding the sand. *Stems* 2–4 ft., smooth or scabrid above. *Leaves* long, rigid, convolute, polished without, scabrid and glaucous within; sheaths long; ligule very long, 2-fid, torn. *Panicle* 3–6 in., straight, broadest and sometimes lobed at the base; branches short. *Spikelets* erect, pedicels scabrid; empty glumes ½–½ in., acute, keel scabrid; fl. glume and palea quite like the empty glumes in colour and texture. *Anthers* ¼ in., linear, yellow.—DISTRIB. Of the genus.—Extensively planted for binding sands.

17. CALAMAGROS'TIS, *Adans.*

Tall, perennial grasses. *Rootstock* creeping, stoloniferous. *Spikelets* in a spreading subsecund panicle, with whorled branches, 1-fld. with sometimes the pedicel of a 2nd (upper) flower. *Empty glumes* much exceeding the flowering, subequal, concave, acute, upper 3-nerved. *Fl. glume* sessile or pedicelled, enveloped in a pencil of silky hairs from the axis, hyaline, 3–5-nerved, truncate, 2-fid, toothed, awned at the tip or back. *Palea* small, 2-nerved. *Scales* entire. *Stamens* 3. *Ovary* glabrous; styles short; stigmas feathery. *Fruit* terete, grooved in front, enveloped in the fl. glume and palea.—DISTRIB. N. temp. regions; species 60.—ETYM. κάλαμος and ἄγρόστις, *reed-grass.*

SUB-GEN. 1. **Calamagros'tis** proper. *Spikelet* without the pedicel of a 2d fl. glume. *Hairs* of the axis exceeding the fl. glumes.

1. **C. Epige'jos,** *Roth*; panicle open, empty glumes subulate-lanceolate and hairs twice as long as the flowering, awn dorsal inserted above the middle of the fl. glume.

Damp woods, from Mull and Aberdeen to Devon and Kent, local; Derry in Ireland; fl. July–Aug.—*Stem* 2–6 ft., simple, stout, scabrid above. *Leaves* very long, flat, scabrid, glaucous beneath, point slender; ligule acute, torn. *Panicle* 4–12 in., purplish-brown; branches suberect. *Empty glumes* ¼ in., very narrow, tip and keel scabrid; awn produced for ½ its length beyond the fl. glume.—DISTRIB. Europe (Arctic), excl. Spain, Siberia, Dahuria Himalaya.

2. **C. lanceola'ta,** *Roth;* panicle open, empty glumes lanceolate twice as long as the flowering, hairs rather longer than the fl. glume, awn terminal minute. *Arundo Calamagrostis,* L.

Damp copses, hedges, &c. from the Border to Devon and Kent; absent from Ireland; fl. July–Aug.—*Stem* 2–4 ft., slender, erect, smooth. *Leaves* much narrower and smoother than *C. Epigejos,* more convolute; ligule shorter. *Panicle* 2–6 in., purplish; branches spreading, tip drooping. *Empty glumes* nearly as large as in *Epigejos,* but broader; awn minute.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia.—Andersson observes that the pedicel of an upper flower is sometimes present.

SUB-GEN. 2. **Deyeux'ia,** *Beauv. Spikelets* with the pedicel of a 2d fl.-glume. *Hairs of the axis* shorter than the fl. glume.

3. **C. stric'ta,** *Nutt.*; panicle close, empty glumes oblong-lanceolate slightly exceeding the flowering, awn from below the middle of the fl. glume straight. *C. lapponica,* Hook. not Hartm.

Bogs and marshes, very rare; Delamere Forest, Forfar (extinct); Lough Neagh; fl. June–July.—*Stems* 1–3 ft., strict, slender, smooth, polished. *Leaves* short, all flat or lower filiform with convolute margins, almost smooth; ligule short. *Panicle* 2–6 in., narrow, erect, pale purplish and green. *Empty glumes* ⅛–¼ in., acute, nearly smooth.—DISTRIB. Scandinavia (Arctic), Dahuria, N. America.—Leaves in cultivated (Irish) specimens quite flat.

VAR. 1, panicle slender, glumes nearly ⅛–¼ in. Delamere and Lough Neagh. —VAR. 2, panicle 1–3 in. narrow short, glumes ⅛ in. broader. Forfar.

18. LEER'SIA, *Soland.*

Spikelets panicled, much compressed, imbricate, gibbous, 1-fld. *Empty glumes* 0. *Fl. glume* hard, awnless, broad, 3-nerved. *Palea* as long, hard, 1-nerved. *Scales* 2, ovate, entire, short. *Stamens* 1–6. *Ovary* glabrous; styles short, stigmas feathery. *Fruit* laterally compressed, enclosed in the hardened glume and palea.—DISTRIB. Temp. and trop. regions; species 10.—ETYM. *J. D. Leers,* a German botanist.

1. **L. oryzoi'des,** *Swartz;* panicle effuse, stamens 3.

Wet meadows and watery places, rare; Surrey, S. Hants, W. Sussex; fl. Aug.–Oct.—Perennial. *Root* creeping. *Stems* 2–3 ft., decumbent at the base, smooth, shining, leafy, nodes villous. *Leaves* ⅛–½ in. broad, flat, scabrid, glaucous; sheaths compressed, almost smooth; ligule truncate, torn. *Panicle* 3–7 in., very lax and few-flowered, partially enclosed in the sheath when flowering, branches in ½ whorls, capillary, flexuous; upper part open with imperfect ovaries; lower part included in the sheath, with fertile ovaries. *Spikelet* ¼ in., dimidiate-oblong, thin but rigid, translucent, smooth or scaberulous, pale green, keels with long rigid cilia.—DISTRIB. Europe from Denmark southwards, trop. Asia, Africa, and S. America.

19. CY'NODON, *Rich.* DOG'S-TOOTH GRASS.

Spikelets laterally compressed, on one side of radiating spreading spikes, 1-fld. with the rudiments of an upper (rarely perfect) flower at the base of the palea. *Empty glumes* 2, much smaller than the flowering, awnless, spreading, subequal. *Fl. glume* convex, 3-nerved. *Palea* narrow, 2-nerved. *Scales* fleshy, truncate. *Stamens* 3. *Ovary* glabrous; styles 2, rather long, stigmas feathery. *Fruit* laterally compressed, enveloped in the fl. glume and palea.—DISTRIB. Temp. and trop. regions; species 8.—ETYM. κύων and ὀδούς, *dog's-tooth.*

1. **C. Dac'tylon,** *Pers.*; leaves short involute, tips obtuse.

Sandy shores of S.W. England, Dorset to Cornwall; Channel Is.; fl. July–Aug.—Perennial. *Stems* 4–10 in., stout, woody, prostrate and extensively creeping, with short subercct leafy and flowering branches, smooth; fl. branches clothed with strongly furrowed sheaths. *Leaves* subulate, stiff, glaucous, strongly nerved; sheaths pale, mouth hairy. *Spikes* 3–6, 1–2 in., radiating, purplish; rachis convex, grooved above. *Spikelets* $\frac{1}{12}$–$\frac{1}{8}$ in., imbricate; empty glumes ovate, acute; keel scabrid.—DISTRIB. Europe from Holland southwards, Asia, Africa; introd. in N. America. The chief pasture of many dry climates. *Doab* and *Bermuda grass.*

20. AIR'A, *L.*

Spikelets laterally compressed, panicled, 2-fld. with sometimes a rudimentary terminal 3d glume. *Empty glumes* 2, equalling the flowering, membranous, subequal, acute, 1-nerved. *Fl. glumes* pedicelled, membranous, subequal, convex, 3-nerved, toothed, awned at the back. *Palea* 2-nerved, 2-fid. *Scales* acuminate, entire or 2-fid. *Stamens* 3. *Ovary* glabrous; stigmas subterminal, feathery to the base. *Fruit* terete, free or adnate to the fl. glume and palea.—DISTRIB. Temp. regions; species 30.—ETYM. A Greek name for some grass.

SUB-GEN. 1. **Deschamp'sia,** *Beauv.* (gen.). Perennial. *Fl. glumes* truncate, toothed, 3–5-nerved; awn from near the base. *Scales* entire. *Fruit* free, not grooved.

1. **A. flexuo'sa,** *L.*; leaves filiform terete solid, branches of panicle spreading capillary, spikelets subterete.

Dry woods, heaths, &c.; ascending to nearly 3,700 ft. in the Highlands; fl. June–Aug.—*Stems* ½–2 ft., erect, slender, polished, naked above. *Leaves* short, curved, obtuse, grooved (not involute), sheath of upper long; ligule short, obtuse. *Panicle* 2–5 in.; branches 2–3-nate. *Spikelets* $\frac{1}{8}$ in.; purplish or yellow-brown, shining; empty glumes acuminate; awn about ½ as long as the spikelet, erect, then bent or twisted.—DISTRIB. Europe (Arctic), W. Siberia, W. Asia, N. America, Fuegia.—Often viviparous.

VAR. 1, *montana,* L. (sp.); subalpine, glumes larger more purple.—VAR. 2, *uliginosa,* Weihe (sp.); leaves capillary, upper fl. glume longer pedicelled.

2. **A. cæspito'sa,** *L.*; leaves flat scabrid, branches of nodding panicle flexuous, spikelets much compressed.

Wet meadows, woods, &c.; ascending to nearly 3,000 ft. in the Highlands; fl. June–July.—*Stems* 2–4 ft., rather stout, leafy, shining, smooth. *Leaves*

coriaceous; sheaths shining, smooth or rough, upper very long; ligule obtuse. *Panicle* 4–8 in., linear-oblong, spreading in flower. *Spikelets* ¼ in., very shining, fulvous or purplish; empty glumes narrow, obtuse, shorter than the flowering, keel scabrid or smooth, upper obscurely 3-nerved; fl. glumes 1-3 (3d always imperfect), silky at the base; awn short, inserted below the middle, variable in length.—DISTRIB. N. and S. temp. and arctic and mountain regions.—A variable grass.

Sub-sp. CÆSPITO'SA proper; tall, leaves longer broader scabrid, branches of panicle rough, awn inserted below the middle usually equalling the glume.

Sub-sp. ALPI'NA, *L.* (sp.); short, leaves narrower channelled smooth, branches of panicle smooth, awn inserted at the middle shorter. *A. lævigata*, Sm.—Usually viviparous. Wet alpine rocks of Perth, Aberdeen, and Sutherland; ascending to 4,100 ft.

SUB-GEN. 2. **Airop'sis,** *Desv.* (gen.). Annual. *Leaves* setaceous. *Fl. glumes* 2, with no rudimentary 3d, sessile, hardening, 2-cuspidate, awned below the middle. *Scales* entire. *Fruit* grooved, adnate to the hardened fl. glume and palea. (Intermediate between *Aira* and *Avena*.)

3. **A. caryophyl'lea,** *L.*; sheaths scabrid, panicle spreading, branches long trichotomous.

Sandy meadows, &c.; ascending to nearly 1,400 ft. in the Highlands; fl. June–July.—*Stems* 2–10 in., tufted, leafless and scabrid above, bent below, often purplish. *Leaves* setaceous, short, scabrid, obtuse; ligule long. *Panicle* 1–2 in. *Spikelets* ⅛ in., ovate, shining; lower empty glume ovate, acuminate, exceeding the flowering, keel scabrid; awn twice as long as its glume, twisted.—DISTRIB. Europe, N. Africa; introd. in N. America.

4. **A. præ'cox,** *L.*; sheaths glabrous, panicle contracted, branches very short with 1–2 spikelets.

Dry pastures, &c.; ascending to 1,800 ft. in Yorkshire; fl. April-June.—Habit of *A. caryophyllea*, but panicle very different; whole plant greener; spikelets narrower; 2-fid points of flowering glume shorter; awn inserted higher up.—DISTRIB. Europe; introd. in N. America.

SUB-GEN. 3. **Coryneph'orus,** *Beauv.* (gen.). Perennial. *Leaves* setaceous. *Fl. glumes* entire, upper pedicelled, awn clavate bent bearded above the base. *Scales* 2-fid. *Fruit* grooved, enclosed in the glume.

5. **A. canes'cens,** *L.*; tufted, leaves short rigid.

Sandy coasts of Norfolk, Suffolk, and Kent, rare; Channel Is.; fl. July.—*Tufts* hard, rigid, pungent. *Stems* 4–8 in., rigid, bent below, glabrous above. *Leaves* 1–2 in., glaucous, involute; upper sheaths long, scaberulous; ligule lanceolate. *Panicle* 1–3 in., narrow-oblong, spreading in flower; branches thickened at the forks, short. *Spikelets* ⅛ in., narrow, pale silvery or purplish; empty glumes narrow, acuminate, tips hyaline; fl. glumes shorter, villous at the base; keel channelled; awn included or shortly exserted, purple below, bearded at the middle where bent, above gradually thickened, white; anthers purplish.—DISTRIB. Europe, Siberia.

21. AVE'NA, *L.*

Spikelets large, terete or laterally compressed, panicled or racemed; 2- or more-fld., upper flower usually imperfect, lower rarely male only. *Empty*

glumes 2, equalling the flowering, subequal, rather membranous, 1-11-nerved. *Fl. glumes* pedicelled, more rigid, rounded at the back or 2-cuspidate, 2-fid with a long bent and twisted awn from the sinus. *Palea* 2-nerved. *Scales* 2-fid. *Stamens* 3. *Ovary* hirsute at the top (except *A. flavescens*); styles distant, stigmas feathery. *Fruit* furrowed, free or adherent to the glume, top usually hairy.—DISTRIB. Temp. and cold regions; species 33.—ETYM. The old Latin name.

SUB-GEN. 1. **Ave'na** proper. *Spikelets* subterete. *Fl. glumes* not keeled; lowest flower 2-sexual. *Fruit* hairy at the top.

* *Annual. Spikelets at length drooping. Empty glumes* 5-11-*nerved.*

1. **A. fat'ua,** *L.*; spikelets 3-flowered, empty glumes 9-nerved, fl. glume below and pedicels hairy.

Corn-fields; common in Great Britain; rare and local in Ireland; a colonist, *Watson;* fl. June–Aug.—*Stem* 1-3 ft., stout, smooth; nodes hairy. *Leaves* flat, scaberulous; sheaths smooth; ligule short, torn. *Panicle* 6-10 in., equally spreading; branches whorled, scabrid. *Spikelets* 1 in., green. *Fl. glumes* 2-fid, with long fulvous hairs below; half as long as the brown awn. —DISTRIB. Europe, N. Africa, Siberia, N.W. India.

A. STRIGO'SA, *Schreb.*; spikelets 2-flowered, empty glumes 7-9-nerved, fl. glumes and pedicels glabrous.

Corn-fields, rare, not indigenous; fl. June–July.—Smaller and more slender than *A. fatua;* leaves sometimes hairy; panicle unilateral; branches fewer; fl. glume more deeply 2-fid, segments awned.—DISTRIB. Of *A. fatua.*

** *Perennial. Spikelets suberect. Empty glumes* 1-3-*nerved.*

2. **A. praten'sis,** *L.*; leaves glaucous glabrous, lower branches of panicle 2-nate with 1-2 3-6-flowered spikelets.

Moors and dry pastures, from Ross and Skye to Devon and Kent; ascending to about 2,200 ft. in the Highlands; absent from Ireland; fl. June–July.—*Root* fibrous, stoloniferous. *Stems* ½-3 ft., erect, scaberulous, bent at the base. *Leaves* flat or involute; lower sheaths more or less scabrid; ligule ovate, acute. *Panicle* racemose, contracted after flowering. *Spikelets* ½-¾ in., pale, shining; fl. glume scabrid; pedicel silky; awn faintly bent, equalling the glume.

VAR. 1, *praten'sis* proper, leaves involute, sheaths terete nearly smooth.—VAR. 2, *alpi'na,* Sm. (sp.); leaves flat, lower sheaths much compressed. *A. planiculmis,* Sm. not Schrad. Mountains.

3. **A. pubes'cens,** *L.*; leaves pubescent, lower branches of panicle 5-nate with 2-4 3-flowered spikelets.

Dry pastures, especially on limestone and chalk; ascending to 1,600 ft. in N. of England; fl. June–July.—Habit of *A. pratensis,* but less densely tufted; leaves flatter; sheaths very pubescent; awns more spreading.—DISTRIB. Europe, Siberia.

SUB-GEN. 2. **Trise'tum,** *Pers.* (gen.). Perennial. *Spikelets* compressed. *Fl. glume* keeled, lowest flower 2-sexual. *Fruit* glabrous, deeply furrowed, free.

4. **A. flaves'cens,** *L.*; panicle open, branches in ½-whorls, fl. glume 2-cuspidate 3-awned.

Dry pastures, from Aberdeen southwards; ascending to 1,600 ft. in N. of England; fl. July–Aug.—*Root* fibrous, stoloniferous. *Stem* 1–2 ft., erect, smooth, glabrous. *Leaves* flat, and sheaths hairy; ligule truncate, ciliate. *Panicle* 2–4 in.; branches many, capillary. *Spikelets* ¼ in., many, 3–4-flowered, shining, yellowish; empty glumes ovate, acuminate; awns very divergent.—DISTRIB. Europe, N. Africa, N. Asia, Himalaya.

SUB-GEN. 3. **Arrhenath'erum,** *Beauv.* (gen.). Perennial. *Spikelets* subterete. *Empty glumes* unequal. *Fl. glumes* convex; lowest flower male. *Fruit* pubescent, furrowed, adherent to the fl. glume and palea.

5. **A. ela'tior,** *L.*; panicle narrow elongate nodding, lower fl. glume long-awned, upper usually awnless. *Arrhenatherum avenaceum,* Beauv.

Fields, hedgerows, and pastures; ascending to 1,500 ft. in N. of England; fl. June–July.—*Rootstock* widely creeping, often tuberous at the nodes. *Stems* 2–4 ft., erect, slender, smooth. *Leaves* flat, scabrid; sheaths smooth; ligule truncate. *Panicle* 6–12 in.; branches 2–3-nate, suberect, very scabrid. *Spikelets* ⅓ in., pale, shining; lower empty glume much smallest; upper oblong-lanceolate, acute; fl. glumes subsessile, hairy below the middle, half as long as the dark twisted bent awn.—DISTRIB. Europe, N. Africa, W. Asia; introd. in N. America.—A most troublesome weed. The 2 flowering glumes are sometimes equally awned.

22. HOL'CUS, *L.*

Spikelets much laterally compressed, in open panicles, 2-fld.; lower flower 2-sexual, upper male. *Empty glumes* 2, enclosing the flowering, boat-shaped, subequal, keeled, lower 1-nerved; upper larger, 3-nerved, notched, with a small terminal awn. *Fl. glumes* 5-nerved, lower sessile, 2-sexual, awnless; upper pedicelled, male, with a dorsal twisted awn. *Palea* 2-nerved, 3-toothed. *Scales* oblique, acuminate. *Stamens* 3. *Ovary* glabrous; stigmas sessile feathery. *Fruit* laterally compressed, not enclosed in the fl. glume.—DISTRIB. Europe, temp. Asia, and N. and S. Africa; species 6.—ETYM. Obscure.

1. **H. lana'tus,** *L.*; softly tomentose, root fibrous, awn of the flowering glume included curved, tip scabrous.

Meadows, copses, waysides, &c.; ascending to 1,800 ft. in Yorkshire; fl. June–Aug.—*Stems* 6–24 in., ascending, slender, leafy. *Leaves* flat, soft, upper sheaths inflated; ligule short. *Panicle* 2–5 in., pale green or pinkish; branches 2–3-nate. *Spikelets* ⅛ in., elliptic-oblong; empty glumes acute, nerves strong.—DISTRIB. Europe, N. Africa, Siberia; introd. in N. America.

2. **H. mol'lis,** *L.*; villous at the nodes, root creeping, awn of fl. glume inflexed exserted.

Sandy and waste places, woods, &c.; less common than *H. lanatus;* ascending to 1,500 ft. in the N. of England; fl. June–Aug.—Similar to *H. lanatus,* but usually more slender; glumes more scabrid and very acuminate.—DISTRIB. Europe except N. Russia, N. Africa.

23. TRIO'DIA, *Br.*

Spikelets few, terete, in racemose panicles, 3–5-fld., upper flower imperfect. *Empty glumes* exceeding the flowering, subequal, herbaceous, acute; upper 3-nerved. *Fl. glumes* convex, 3-toothed, keeled, 7-nerved. *Palea* sub-

entire, ciliate. *Scales* broad, fleshy. *Stamens* 3. *Ovary* stipitate, glabrous; styles short, terminal, stigmas feathery. *Fruit* free, plano-convex. —DISTRIB. Europe, temp. Asia, N. Africa, Australia; species 6.—ETYM. τρεῖς and ὀδούς, from the *three teeth*.

1. **T. decum'bens,** *Beauv.*; spikelets 6–10 turgid. *Danthonia*, DC.

Dry pastures and moors; ascending to 1,800 ft. in Yorkshire; fl. July.—Perennial, bright green. *Root* fibrous. *Stems* 6–12 in., densely tufted, rigid, glabrous, leafy. *Leaves* obtuse, coriaceous, slender, at length involute, hairy below; sheaths grooved, lower hairy; mouth with a row of hairs. *Panicle* 1–2 in., erect; rachis and branches flexuous. *Spikelets* ¼–½ in., obovoid, shining, pale green and purplish, axis very short; empty glumes large, ovate, acute, keel scabrid, margins hyaline; fl. glumes 3–4, ovoid, not keeled, coriaceous, imbricate, bearded at the base, ciliate on the lower margins. *Palea* broad.—DISTRIB. Europe, N. Africa.

24. PHRAGMI'TES, *Trin.* REED.

Stout water-reeds. *Spikelets* subterete, panicled, 4–6-flowered; lower fl. male, the rest 2-sexual; branches in ½-whorls. *Empty glumes* 2, much shorter than the flowering, unequal, membranous, keeled. *Fl. glumes* distant, pedicelled; lowest naked, 1–3-androus; the rest 3-androus, enveloped in long silky basal hairs, very long acuminate, 3-nerved, entire. *Palea* short, 2-nerved. *Scales* large, obtuse. *Stamens* 3. *Ovary* glabrous, styles short, stigmas feathery.—*Fruit* terete, loosely wrapped in the fl. glume.—DISTRIB. Arctic and temp. zones; species 5.—ETYM. Obscure.

1. **P. commu'nis,** *Trin.*; panicle very large soft dull purple nodding, silky hairs equalling the fl. glumes. *Arundo Phragmites*, L.

Edges of lakes, &c.; fl. July–Aug.—*Rootstock* extensively creeping, jointed. *Stem* 6–10 ft., stout, terete, erect, smooth. *Leaves* ½–1 in. broad, flat, rigid, acuminate, glaucous beneath, edges hispid; sheath smooth, mouth bearded. *Panicle* 10–18 in., ovoid, dense; branches smooth, with long scattered hairs. *Spikelets* ½–¾ in., 3–5-fld., shining; empty glumes lanceolate, ½ the length of the flowering, which are very narrow subulate.—DISTRIB. Europe (Arctic), N. temp. and trop. Asia, Africa, America, Australia.

25. MEL'ICA, *L.*

Spikelets terete, racemed or panicled, 1–2-fld., with a terminal long-pedicelled cuneate flowerless glume embracing 2–3 others. *Empty glumes* 2, longer or shorter than the flowering, membranous, convex, subequal, awnless. *Fl. glumes* cartilaginous, convex, 5–7-nerved, awnless. *Palea* 2-nerved. *Scales* fleshy, connate. *Ovary* glabrous; stigmas sessile feathery. *Fruit* oblong, subterete, loosely wrapped in the fl. glume.—DISTRIB. Temp. and subtrop. regions; species 20.—ETYM. An old name.

1. **M. nu'tans,** *L.*; spikelets drooping racemed secund ovoid 2-fld.

Woods, from Argyle and Ross to Shropshire and Derby, ascending to nearly 1,400 ft. in the Highlands; absent from Ireland; fl. May–June.—Stoloniferous. *Stems* 10–18 in., filiform, inclined, 3-quetrous, scabrid above, with scaly sheaths below. *Leaves* flat, slender, sparsely hairy, edge and keel scabrid; ligule 0. *Racemes* 1–2 in., drooping; rachis flexuous. *Spikelets* 6–10, ½–¾ in., very shortly pedunculed, broad; empty glumes purple, oblong, edges

and tips broadly scarious ; fl. glumes greenish, strongly keeled, purple below the scarious tip, glabrous.—DISTRIB. Europe (Arctic), N. Asia.

2. **M. uniflor'a**, *Retz;* spikelets very few erect panicled on long capillary peduncles 2-fld., upper flower male.

Woods, from Elgin southwards ; ascending above 1,500 ft. in N. of England ; common in Ireland ; fl. May–July.—Habit, foliage, spikelets, and colouring of *M. nutans*, but inflorescence very different ; ligule long, from the auricles of the sheath ; rachis of panicle capillary ; lower branches 2-nate, 1–1½ in. ; spikelets on capillary scaberulous peduncles.—DISTRIB. Europe.

26. DAC'TYLIS, *L.* COCK'S-FOOT GRASS.

Spikelets laterally compressed, secund, sessile, densely imbricate at the end of the branches of a one-sided panicle, 3-many-fld. *Empty glumes* 2, shorter than the lowest flowering, membranous, unequal ; upper larger, 3-nerved. *Fl. glumes* cartilaginous, keeled, 5-nerved ; awn subterminal, short, scabrid. *Palea* 2-fid, nerves ciliate. *Scales* 2, acutely toothed. *Stamens* 3. *Ovary* glabrous ; styles terminal, stigmas feathery. *Fruit* loosely enveloped in the glume. — DISTRIB. Cold and temp. regions ; species 6.—ETYM. δακτυλίς, a *finger's* breadth ; of obscure application.

1. **D. glomera'ta**, *L.* ; rough, leaves broad flat.

Pastures, waste places, &c. ; ascending to 1,600 ft. in the N. of England ; fl. June–July.—Perennial. *Stems* 2–3 ft., creeping below, erect, stout, smooth. *Leaves* long, flat, keeled, compressed ; sheaths scabrid ; ligule long. *Panicle* strict, 1–6 in., green and violet ; lower branches few, long, strict, scabrid, horizontal in flower, erect in fruit. *Spikelets* ⅛ in., oblong, 4-fld., scabrid.—DISTRIB. Europe (Arctic), N. Africa, Siberia, N. India; introd. in N. America.

27. KOELE'RIA, *Pers.*

Spikelets oblong, compressed, in a contracted spikelike panicle, 2–4-fld. *Empty glumes* 2, rather shorter than the flowering, unequal, compressed, keeled, membranous ; upper 3-nerved. *Fl. glumes* rather close, membranous, acuminate, obscurely keeled, 5-nerved at the base, lowest sessile. *Palea* 2-fid. *Scales* 2, oblique. *Stamens* 3. *Ovary* glabrous ; styles terminal, stout, stigmas feathery. *Fruit* plano-convex, free.—DISTRIB. Temp. regions ; species 8.—ETYM. *G. L. Koeler*, a German writer on grasses.

1. **K. crista'ta**, *Pers.* ; panicle silvery interrupted below.

Banks, pastures ; ascending to 1,800 ft. in Yorkshire ; fl. June–July.—Perennial, pubescent or silky, pale green. *Root* fibrous, stoloniferous. *Stems* 1–3 ft., slender. *Leaves* narrow, glabrous beneath, soon involute ; sheaths striate ; ligule 0. *Panicle* 1–4 in., linear-oblong or lanceolate ; branches 2–3-nate, very short. *Spikelets* ⅛ in., shining, pale green ; empty glumes oblong-lanceolate, acute, broadly hyaline ; keel minutely scaberulous ; axis pubescent ; fl. glumes linear-lanceolate, scaberulous, mucronate.—DISTRIB. Europe, N. Asia Africa and America, Himalaya, temp. S. America, Australia, New Zealand.

28. MOLIN'IA, *Schrank.*

Spikelets subterete, in a slender panicle, 1–5-fld., upper fl. imperfect. *Empty glumes* 2, much shorter than the flowering, equal, convex, 1-nerved. *Fl. glumes* pedicelled, conical, acute, awnless, cartilaginous, with 3 very

strong nerves. *Palea* 2-nerved. *Scales* membranous, 1-toothed. *Stamens* 3. *Ovary* glabrous; styles short, stigmas feathery. *Fruit* sub-4-gonous, furrowed, 2-beaked with the persistent style-bases, enclosed in the cartilaginous fl. glume.—DISTRIB. N. temp. regions; species 4.—ETYM. *G. J. Molina*, a writer on Chilian Botany, &c.

1. **M. cæru'lea,** *Mœnch;* leaves flat, stem wiry. *Enodium*, Gaud.

Wet moors, &c.; ascending to nearly 3,000 ft. in the Highlands; fl. July–Aug.—*Stems* 1–3 ft., terete, striate, with but one node, and that towards the base, naked above. *Leaves* smooth, rigid, hairy at the base, tips very slender; sheaths smooth; ligule 0. *Panicle* 1–12 in., usually stout, very contracted; rachis flexuous, compressed; branches erect. *Spikelets* few, ¼ in., narrow, reddish or violet-purple or green; empty glumes subacute; fl. glumes deciduous, ovate-lanceolate, subacute; anthers violet-brown.—DISTRIB. Europe (Arctic), Siberia, W. Asia, N. Africa.

VAR. 1, *cæru'lea* proper; spikelets blue-purple 2–3-fld., fl. glumes 3-nerved.—VAR. 2, *depaupera'ta,* Lindl. (sp.); spikelets green 1-fld., fl. glumes 3–5-nerved.

29. PO'A, *L.* MEADOW-GRASS.

Spikelets compressed, in branched usually effuse panicles, 2–many-flowered; branches 2-nate or in ½-whorls. *Empty glumes* 2, shorter than the lowest flowering, unequal, acute or obtuse, keeled; lower 1-nerved; upper larger, 3-nerved. *Fl. glumes* often webbed below, keeled, acute, 5-nerved, tips hyaline. *Palea* 2-fid, nerves ciliate. *Scales* tumid below. *Stamens* 3. *Ovary* glabrous; styles 2, short, terminal, stigmas feathery. *Fruit* obtusely 3-gonous, grooved, glabrous, free.—DISTRIB. Chiefly cold and temp. regions; species 90.—ETYM. *πόα*, fodder.

* *Annual. Branches of the panicle solitary or* 2*-nate. Fl. glumes nearly glabrous.*

1. **P. an'nua,** *L.*; stems compressed leaves obtuse, ligule long acute, branches of panicle 2-nate at length deflexed, fl. glumes 3–7 5-nerved.

Waste places, &c.; ascending to 3,200 ft. in the Highlands; fl. April–Sept.—Flaccid, bright green, sometimes glaucous, quite glabrous and smooth. *Stems* 6–12 in., weak. *Leaves* linear, subacuto, often waved. *Panicle* 1–3 in., subpyramidal, subsecund, green or purplish. *Spikelets* ⅛ in., subsessile; empty glumes broadly hyaline, upper broadest in the middle; fl. glumes glabrous or hairy below the middle.—DISTRIB. N. temp. Europe (Arctic), Asia, and N. Africa; doubtfully native of N. America.

** *Perennial; rootstock creeping, stoloniferous.*

2. **P. praten'sis,** *L.*; stem smooth terete, upper leaf shorter than its sheath, ligule long, branches of diffuse panicle 3–5-nate scabrid, fl. glumes 3–5 acute webbed, edges and keel silky, nerves 5 distinct.

Meadows, banks, and pastures; ascending to 2,400 ft. in Yorkshire, and nearly 2,800 ft. in Ireland; fl. June–July.—Glabrous, pale green. *Stems* 1–2 ft., rather stout. *Leaves* linear, flat, acute, tip often concave; sheaths subcompressed. *Panicle* 2–6 in., pyramidal; branches long or short, rarely 2–3-nate. *Spikelets* ⅛–⅓ in., green or purplish; empty glumes acuminate, keel scabrid; fl. glumes broadly hyaline.—DISTRIB. N. temp. and arctic regions.—*P. subcæru'lea,* Sm., is a small glaucous state, and *P. angustifolia,* L. (sp.), another with slender leaves.

3. **P. compres'sa,** *L.*; stem smooth compressed, upper leaf equalling or exceeding its sheath, ligule short, branches of effuse panicle 2–3-nate scabrid, fl. glumes 4–9 obtuse nearly glabrous, nerves obscure.

Dry banks, walls, &c. from Ross southwards; Londonderry only in Ireland; fl. June–July.—Smooth or slightly rough, glabrous, more or less glaucous. *Stems* 1–2 ft., usually much bent towards the base. *Leaves* flat, rough or not. *Panicle* 1–3 in., usually more secund and contracted than in *P. pratensis*, but sometimes effuse. *Spikelets* ⅛ in., green or bluish-purple; empty glumes subequal; fl. glumes broadly hyaline, 3-nerved (*P. subcompressa*, Parn.) or 5-nerved (*P. polynoda*, Parn.) and then more usually webbed.—DISTRIB. Europe, N. and W. Asia; doubtfully native of N. America.

*** *Rootstock shortly creeping, stolons* 0.

4. **P. trivia'lis,** *L.*; stems and sheaths rough, ligule oblong acute, branches of effuse panicle 5-nate scabrid, fl. glumes 3–5 acuminate glabrous or webbed, nerves 5 distinct.

Woods and meadows; ascending to nearly 2,500 ft. in the Highlands; fl. June–July.—Very near indeed to *P. pratensis*, and chiefly distinguishable by the roughness, and absence of stolons.—DISTRIB. Europe, N. Africa, Siberia, Dahuria; introd. in N. America.

5. **P. nemora'lis,** *L.*; stems and sheaths smooth, ligule 0, branches of the subsecund panicle 2–5-nate scabrid, fl. glumes 1–5 subacute, edges and keel pubescent, nerves obsolete.

Copses and woods, from Skye and Elgin southwards; ascending to nearly 1,600 ft. in the Highlands; E. and N. of Ireland, rare; fl. June–July.—Smooth, bright green, glaucous or not. *Stems* 1–3 ft., very slender, terete or slightly compressed. *Leaves* linear, very narrow, flaccid; sheaths smooth, striate. *Panicle* 2–5 in., slender, nodding. *Spikelets* small, ⅛ in., yellow-green and purplish; empty glumes often equalling the flowering, acuminate; fl. glumes 2–5, scarcely hyaline at the tip or margins.—DISTRIB. Europe, N. Asia, Himalaya, N. America.

VAR. 1, *nemora'lis* proper; upper leaf equalling the sheath, ligule very short, fl. glumes webbed.—VAR. 2, *Parnel'lii*, Bab. (sp.); upper leaf usually shorter than its sheath, ligule short, fl. glumes hardly webbed.—VAR. 3, *glauca*, Sm.; stem strict, base creeping, upper node very long, leaves glaucous, upper equalling the sheath, ligule ovate obtuse, fl. glumes webbed. *P. Balfourii*, Parn. Alpine rocks, N. Wales, Yorkshire, northwards to Argyle, Perth, and Aberdeen; alt. 2,000–3,000 ft.—*P. montana*, Parn., is intermediate between this and *nemoralis* proper. *P. cæsia*, Sm., is a doubtful plant.

6. **P. lax'a,** *Hænke*; stems slightly compressed smooth, leaves short, ligules long torn acute, branches of narrow lax subsecund panicle solitary or 2-nate smooth, fl. glumes 2–4, keel and margins villous, nerves 3–5 obscure. *P. flexuosa*, Sm.

Rocky shelves on the lofty Alps of Aberdeen and Inverness; ascending to about 3,600 ft.; fl. July–Aug.—Flaccid, smooth, pale glaucous green. *Stems* 4–10 in., compressed and prostrate below. *Leaves* linear, obliquely mucronate, upper longer than its sheath; sheaths compressed. *Panicle* 1–3 in., drooping, lax or open, branches rarely scaberulous. *Spikelets* ⅛–⅛ in., often viviparous, green and purplish; empty glumes acuminate, tips hyaline.—DISTRIB. N. Alpine and Arctic Europe, Siberia, N. America.—Often with difficulty distinguished from *P. alpina*.

VAR. 1, *lax'a* proper; leaves flat, fl. glumes not webbed.—VAR. 2, *mi'nor*, Gaud. (sp.); leaves keeled curved, fl. glumes webbed, nerves more distinct.

7. **P. alpi'na,** *L.*; stem glabrous terete, leaves broad firm tip rounded, upper ligules long acute, branches of erect spreading panicle 2-nate, fl. glumes 3–9, keel and edges pubescent, nerves 3–5 obscure.

Rocks, &c. on lofty mts., from York and Westmoreland northwards; ascending to 4,000 ft.; W. of Ireland, very rare; fl. June–Aug.—Smooth, glabrous. *Rootstock* stout, creeping. *Stems* 10–18 in., stout. *Leaves* rather short, strict, rigid, keeled, mucronate, edges thickened scabrid, upper shorter than its sheath; lower sheaths broad, white, membranous, persistent, leafless, upper compressed smooth. *Panicle* oblong or pyramidal, 1–3 in. broad. *Spikelets* ⅓ in., green and purplish, often viviparous; empty glumes unequal, ovate, acute; fl. glumes with hyaline tips, webbed, also broad.—DISTRIB. N. Alpine and Arctic Europe, Siberia, W. Asia, Himalaya, N. America.

8. **P. bulbo'sa,** *L.*; stems tuberous below and terete sheaths smooth, leaves narrow, ligules all long acute, branches of panicle 2-nate scabrid, fl. glumes 3–6, margins and acute keel pubescent, nerves obsolete.

Sandy sea-shores, E. and S. of England, from Norfolk and Kent to Devon; fl. April–May.—Glabrous, rather rigid. *Stems* 6–10 in.; tubers ovoid, ¼–½ in., covered with lax sheaths. *Leaves* 1–1½ in., very narrow, keeled, curved, upper very short; lower sheaths short, upper long compressed. *Panicle* 1–1½ in., ovate, compressed. *Spikelets* ⅓ in. broad, green and purplish-brown; empty glumes ovate, acute, keel scabrid; fl. glumes also broad, acute.—DISTRIB. Europe, N. Africa, Siberia.—Very near *P. alpina*, but differing in locality, habit, and the close ovate panicle.

30. CATABRO'SA, *Beauv.*

Spikelets minute, subterete, obconic, in branched effuse panicles, 1- or more-fld. *Empty glumes* 2, much shorter than the flowering, unequal, scarious, convex, awnless; upper truncate, crenulate. *Fl. glumes* coriaceous, cuneate, terete, 5-nerved, torn at the membranous tip, back smooth, awnless; lower sessile; upper pedicelled, often flowerless or male. *Palea* as long. *Scales* ovate-oblong. *Stamens* 3. *Ovary* ovoid, glabrous; stigmas subsessile, feathery. *Fruit* compressed, not furrowed, free.—DISTRIB. Temp. and cold regions; species 5.—ETYM. *καταβρώσις*, from the *erose* top of the glumes.

1. **C. aquat'ica,** *Beauv.*; panicle pyramidal.

Watery places, from Devon and Kent northwards; fl. May–June.—Terrestrial or aquatic, soft, bright green, flaccid. *Rootstock* stout, branched, creeping and rooting at the nodes. *Stem* 6–12 in., bent below, then erect, compressed, smooth, striate, leafy, sometimes much branched. *Leaves* flat, ⅛–¼ in. broad, linear, obtuse, upper short; sheaths inflated, smooth; ligule ovate, obtuse. *Panicle* 1–4 in., rachis stout, grooved; branches whorled, divided, slender. *Spikelets* ⅓ in., subsolitary, pedicelled, green and purplish; empty glumes 1-nerved, green, tips very broad; fl. glumes fulvous or purplish, smooth; nerves green; anthers white.—DISTRIB. Europe, N. Africa, Siberia, Himalaya, N. America.—Var. *littora'lis*, Parn., has smaller 1-fld. spikelets. W. coasts.

31. GLYCE'RIA, *Br.* MANNA GRASS.

Spikelets linear, subterete, in effuse or contracted panicles, rarely spiked, 3-many-flowered, branches in ½-whorls. *Empty glumes* 2, shorter than the lowest flowering, 1–3-nerved, unequal, membranous, convex, awnless; upper larger. *Fl. glumes* caducous, cartilaginous, convex, not keeled, tip obtuse usually scarious; nerves 5–7, parallel. *Palea* 2-fid, nerves ciliate. *Scales* fleshy, truncate. *Stamens* 3. *Ovary* glabrous; styles terminal, short or 0, stigmas feathery. *Fruit* oblong, free, channelled or not.—DISTRIB. Temp. and cold climates; species 20.—ETYM. γλυκερός, in allusion to the *sweet* grain.

SECTION 1. **Glyce'ria** proper. Perennial. *Leaves* flat; sheaths entire. *Fl. glume* strongly nerved. *Hairs of stigma* branched. *Fruit* grooved.

1. **G. aquat'ica,** *Sm.*; panicle much branched, spikelets oblong, fl. glumes 5–9 entire. *G. spectabilis,* Mert. and Koch.

Watery places; fl. July–Aug.—*Rootstock* stout, extensively creeping. *Stem* 2–6 ft., stout, smooth, striate. *Leaves* 1–2 ft., ⅓–½ in. broad, suberect, acute; sheaths smooth; ligule short. *Panicle* 6–12 in. *Spikelets* ¼ in., yellow-green and purple; glumes scabrid; empty short, shining; flowering rigid, obtuse; nerves strong.—DISTRIB. Europe, Siberia, Himalaya, N. America.

2. **G. flu'itans,** *Br.*; panicle subsimple, spikelets linear, fl. glumes 7–20.

Watery places; ascending to 1,600 ft. in Yorkshire; fl. July–Aug.—*Rootstock* stout, widely creeping. *Stem* 1–3 ft., stout, branched, terete, floating or creeping, smooth. *Leaves* ¼–½ in. broad, flat, acute, short, or the upper long and floating; sheaths long, compressed; ligule broad, acute. *Panicle* 1–2 ft., simple or branched; rachis 3-gonous; branches remote, smooth. *Spikelets* ¼–2 in., erect, green or tips purplish; empty glumes unequal, tips torn; fl. glumes scabrid, tips often ragged.—DISTRIB. Europe, N. Africa, W. Siberia, Himalaya, N. America.

Sub-sp. FLU'ITANS proper; sheaths striate, branches of fruiting panicle erect, tip of fl. glume subentire, anthers purple very narrow.

Sub-sp. PLICA'TA, *Fries* (sp.); sheaths furrowed, branches of fruiting panicle spreading, tip of fl. glume 3-toothed, anthers broader. *G. pedicellata,* Towns.

SECTION 2. SCLEROCHLO'A, *Beauv.* (gen.). *Leaves* with split sheaths. *Fl. glume* obscurely 5-nerved. *Stigmas* subsessile, hairs simple. *Fruit* obscurely grooved.

* *Empty glumes 3-nerved* (Atropis, *Rupr.*).

3. **G. marit'ima,** *Wahlb.*; perennial, stolons long, leaves involute, ligule oblong, branches of panicle solitary or 2–3-nate, fl. glumes 4–12, tip subacute.

Muddy, &c. sea-coasts; fl. July.—*Rootstock* widely creeping. *Stems* 8–16 in., terete, smooth. *Leaves* involute or channelled, acute or pungent; sheaths smooth; ligule rather long, oblong. *Panicle* 1–3 in., oblong, contracted; branches appressed or horizontal, rarely deflexed, or more than 3-nate; rachis subterete, grooved on one side. *Spikelets* ¼–⅓ in., ovate-oblong or linear-elongate, green or purplish; empty glumes subacute; fl. glumes obscurely 3-toothed, tip hyaline or not.—DISTRIB. Europe, N. Africa, Siberia, N. America.

4. **G. dis'tans,** *Wahl.*; perennial, leaves flat, ligule short, branches of panicle 4–5-nate at length deflexed, fl. glumes 3–6 truncate.

Sandy chiefly maritime places in Great Britain; S. and E. of Ireland, rare; fl. July–Aug.—Very closely allied to *G. maritima,* but rarely stoloniferous; leaves broader and flatter; stem in the typical states much taller and more slender; panicle more branched with horizontal and deflexed branches, and spikelets much smaller, ⅛–¼ in. or less.—DISTRIB. Europe, N. Africa, Siberia, Himalaya, N. America.

Sub-sp. DIS'TANS proper; branches of panicle smooth, rachis furrowed, spikelets distant.—Common; rarely found inland.

Sub-sp. CONFER'TA, *Fries* (sp.); stoloniferous, branches of panicle scabrid, rachis not furrowed, spikelets crowded smaller, fl. glumes 4–7, tips 3-toothed. *G. Borreri,* Bab.—Intermediate between *G. maritima* and *distans.* S. coast chiefly; Ireland, Dublin only.—W. Europe.

5. **G. procum'bens,** *Sm.*; annual, leaves flat, ligule short, sheaths inflated, branches of rigid panicle short solitary or 2–3-nate, fl. glumes 3–5 obtuse mucronate.

Muddy sea-shores of England; S.E. of Ireland, rare; fl. June–July.—*Root* fibrous. *Stems* 3–6 in., short, stout, rigid, spreading, erect or decumbent. *Leaves* short, subacute, glaucous; sheaths large, grooved. *Panicle* 1–2 in., green; rachis angular; branches stout, erecto-patent, subdistichous, smooth. *Spikelets* ⅛–¼ in., subsessile, crowded.—DISTRIB. W. Europe from Holland to Spain and Italy, N. Africa, Siberia, Himalaya, N. America.

** *Annual, rigid and wiry. Empty glumes* 1-*nerved.* (Catapodium, *Link.*)

6. **G. rig'ida,** *Sm.*; branches of panicle distichous with 3–5 subsessile spikelets, fl. glumes 7–10 acute, nerves faint.

Dry rocks, walls, &c., from Ross southwards; rather rare in Ireland; fl. June.—Often purple, glabrous, smooth. *Root* fibrous. *Stems* 3–6 in. *Leaves* involute, subsetaceous; sheaths terete, grooved; ligule oblong. *Panicle* 1½–2½ in., strict; rachis broadly channelled, edges scabrid. *Spikelets* ⅛–¼ in., rarely solitary (then spiked); pedicels short, stout, ½-terete; fl. glumes quite terete, shining, smooth.—DISTRIB. W. and S. Europe from Holland southwards, Canaries.

7. **G. lolia'cea,** *Watson;* spikelets spiked distichous, fl. glumes 8–12, obtuse mucronate, nerves faint. *Poa,* Huds.; *Sclerochloa,* Woods.

Sandy shores, from Fife southwards, and in Ireland; fl. July–Aug.—Green, smooth, glabrous. *Root* fibrous. *Stems* spreading and erect, leafy. *Leaves* small, flat or involute; sheaths smooth; ligule oblong. *Spikes* strict, 1–2½ in.; rachis stout, ½-terete, hardly flexuous, edges smooth. *Spikelets* ¼–½ in., sessile, erect, green; fl. glumes broad, obtusely-keeled, smooth; lateral nerves strongest.—DISTRIB. S. and W. Europe from France to Dalmatia, N. Africa.

32. BRI'ZA, *L.* QUAKING GRASS.

Spikelets large, ovate or cordate, compressed, pendulous, in effuse panicles, many-flowered; branches in ½-whorls; pedicels capillary. *Empty glumes* 2, longer or shorter than the lowest flowering, subequal, broad, rounded at the back. *Fl. glumes* imbricate, boat-shaped or saccate, horizontal, very obtuse, many-nerved. *Palea* narrow, nerves ciliate. *Scales* 2, ovate-lanceolate. *Stamens* 3. *Ovary* glabrous; styles short,

terminal, stigmas feathery. *Fruit* broadly ovoid, compressed, adhering to the hardened glume.—DISTRIB. Temp. Europe, Africa, and Asia; species 6.—ETYM. An old Greek name.

1. **B. me'dia,** *L.*; perennial, ligule short, spikelets ovate, empty glumes shorter than the 1st fl. glume.

Meadows and heaths, &c. from Ross southwards; ascending to 2,100 ft. in Yorkshire; fl. June.—*Stems* solitary, creeping below, 6–18 in., very slender, smooth. *Leaves* flat, smooth or scabrid; sheaths smooth, upper inflated. *Panicle* pyramidal; branches very long, capillary. *Spikelets* ¼–½ in., green or purplish, shining; fl. glumes 5–9, sheathing one another.—DISTRIB. Europe, Siberia, W. Asia; introd. in N. America.

2. **B. mi'nor,** *L.*; annual, ligule long, empty glumes longer than the 1st fl. glume.

Fields, from Hants to Cornwall; Cork in Ireland; Channel Is.; fl. July.—*Stems* tufted, 4–10 in. *Panicle* almost as in *B. media*, but spikelets more numerous, smaller, ⅛ in. diam., broader than long.—DISTRIB. Europe from France and Spain to Turkey, N. Africa.

33. FESTU'CA, *L.* FESCUE GRASS.

Spikelets subterete, racemose or panicled, 3- or more-fld. *Empty glumes* 2, rarely 1, shorter than the lowest flowering, unequal, membranous, acute; upper larger, 3-nerved; lower 1-nerved. *Fl. glumes* convex, 3–5-nerved, mucronate or awned at or near the tip. *Palea* 2-fid, nerves hairy. *Scales* 2, notched. *Stamens* 1–3. *Ovary* glabrous; styles terminal, stigmas feathery. *Fruit* adnate to the fl. glume and palea.—DISTRIB. Arctic, cold and temp. regions; species 125.—ETYM. An old Latin name.

SECTION 1. **Schedono'rus,** *Beauv.* Perennial. *Leaves* broad, flat. *Awn* 0 (except in *F. gigantea*). *Flowers* 3-androus.

* *Ligule of upper sheath short.*

1. **F. ela'tior,** *L.*; leaves flat, panicle diffuse nodding, fl. glumes 3–7 glabrous acute or almost awned, ovary glabrous.

River-banks and wet places; ascending to 1,300 ft. in the N. of England; fl. June–July.—*Rootstock* creeping, stoloniferous. *Stem* 2–6 ft., nodding, smooth. *Leaves* ¼–½ in. broad, smooth; sheaths smooth, striate. *Panicle* 3–6 in., contracted after flowering; rachis 3-quetrous, smooth; branches 2-nate, scabrid. *Spikelets* many, ½–¾ in., linear-oblong, green and dull purple; empty glumes broadly hyaline; fl. glumes scabrid above, rarely awned; margins hyaline.—DISTRIB. Europe (Arctic), N. Africa, W. Siberia, Himalaya, N. America.—A form with branches of panicle divaricate after flowering is the *F. arundinacea*, Schreb.

2. **F. praten'sis,** *Huds.*; leaves flat, panicle subsecund nodding close, fl. glumes 4–10 glabrous obtuse or mucronate, ovary glabrous.

River-banks and wet places; ascending to 1,600 ft. in the N. of England; fl. June–July.—Very closely allied to *F. elatior*, and perhaps only a sub-species, but smaller, less stoloniferous; panicle much narrower, more simple, sometimes 10 in., branches shorter, in pairs, one with 1 spikelet, the other with 2 or more; fl. glumes more numerous, sometimes shortly awned.—DISTRIB. Europe (Arctic), Siberia, Dahuria; introd. in N. America.

VAR. *loliacea,* Huds. (sp.); inflorescence racemose or spiked, spikelets distichous, awn 0, fl. glumes more obtuse.

3. **F. gigan'tea,** *Vill.*; leaves flat, panicle very open nodding, fl. glumes 3–8 scabrid, awn double their length, ovary glabrous. *Bromus,* L.

Damp woods and hedgebanks, from Argyle and Elgin southwards; ascending to 1,000 ft. in Yorkshire; fl. July–Aug.—Habit of *Bromus. Root* fibrous. *Stem* 2–4 ft., smooth, terete, nodding. *Leaves* flaccid, ¼–½ in. broad, bright green, striate, scaberulous above; sheaths smooth. *Panicle* 8–12 in.; branches in pairs, and 3-quetrous rachis long slender scabrid. *Spikelets* ½ in., linear-ovate or -oblong, membranous, pale green; empty glumes lanceolate, broadly hyaline; fl. glumes 2-fid, awn variable in length, very slender, flexuous; styles subterminal.—DISTRIB. Europe, Siberia.—Flowers sometimes few (*F. triflora,* Sm.).

** *Ligule of upper sheath long, not auricled.*

4. **F. sylvat'ica,** *Vill.*; leaves involute, panicle open subsecund suberect, fl. glumes 3–5 acute scabrid, top of ovary hairy. *F. Calamaria,* Sm.

Woods in hilly districts, from Banff and Inverness southwards; rare in Ireland; fl. July.—*Root* fibrous, stolons short. *Stem* 2–3 ft., stiff, erect, smooth, terete. *Leaves* ¼–½ in. broad, glaucous above, edges scabrid; sheaths almost smooth, lower lax leafless brown. *Panicle* 3–6 in., ovate, much branched; rachis and 2–4-nate branches very slender, slightly scabrid. *Spikelets* ¼ in., broadly ovate, small, flat, pale yellow-green; axis scabrid; empty glumes linear-subulate; fl. glumes spreading, slender, acuminate, shortly awned, scaberulous.—DISTRIB. W. Europe to Austria, Germany, and Italy.—*F. decidua,* Sm., is a narrower-leaved 2-flowered variety.

SECTION 2. **Festu'ca** proper. Perennial. *Lower* (or all) *leaves* setaceous; ligule auricled. *Spikelets* panicled. *Flowers* 3-androus.

5. **F. ovi'na,** *L.*; glaucous, leaves setaceous or upper flat, ligule 2-lobed, panicle subunilateral, spikelets 4–10-fld. purplish, fl. glumes terete mucronate or shortly awned.

Dry hilly pastures, woods, &c., at all elevations; fl. June–July.—One of the most abundant grasses, 3–24 in., slender, variable in size, colour, and habit; the following sub-species express its principal modifications.—DISTRIB. Europe, N. Africa, Siberia, Himalaya, N. and S. America, Mts. of Australia and New Zealand.

Sub-sp. OVI'NA proper; densely tufted, leaves all setaceous, sheaths glabrous, panicle contracted subsecund, spikelets small, fl. glumes ⅛ in. awned often viviparous.—Upland copses, moors and sandy places; ascending to 4,300 ft. (Arctic).—VAR. *tenuifo'lia,* Sibth. (sp.); leaves very slender setaceous, fl. glumes awnless.

Sub-sp. DURIUS'CULA, *L.* (sp.); less densely tufted, stem-leaves flat, sheaths downy, panicle more open, fl. glumes ¼ in. narrow.—Moist hilly places; ascending to 2,700 ft. in the Highlands.

Sub-sp. RU'BRA, *L.* (sp.); taller, laxly tufted, stoloniferous, leaves flat or involute, lower sheaths hairy, panicle effuse subsecund, spikelets pale red, fl. glumes ⅛–¼ in. broader awned.—Shaded places in low grounds.—VAR. *sabulic'ola,* Dusf.; creeping, leaves all involute. Sandy shores.

SECTION 3. **Vul'pia,** *Gmel.* (gen.). Annual. *Leaves* setaceous. *Spikelets* racemose or spiked. *Flowers* 1-3-androus.

6. **F. Myu'rus,** *L.*; panicle branched at the base only, very long and

slender, lower empty glume small, fl. glumes 5–8 equalling their slender awns, stamens 1–3.

Walls, sandy and gravelly pastures; ascending to near 1,000 ft. in Yorkshire; fl. June.—*Root* fibrous. *Stems* 6–18 in., very slender, leafy, glabrous, lower setaceous; upper sheaths long, terete, grooved, smooth; ligule very short. *Panicle* 4–10 in., strict or flexuous, very narrow, opaque or shining, glabrous or pubescent, rachis and branches angular, smooth or scaberulous; lower branches appressed; upper very short. *Spikelets* with the awns ½–¾ in., cuneate when expanded, axis smooth; empty glumes subulate; fl. glumes distant, terete, almost subulate, narrowed into the slender awn; nerves obscure.—DISTRIB. Europe, N. Africa; introd. in N. America.

Sub-sp. MYU'RUS proper; slender, upper sheath exceeding the stem and often the long slender panicle, lower empty glume ⅓ shorter than the upper. *F. pseudo-myurus*, Koch.—VAR. *ambig'ua*, Le Gall (sp.); upper empty glume 3–6 times as long as the lower. I. of Wight.

Sub-sp. SCIUROI'DES, *Roth* (sp.); stem naked above, panicle more open, lower branches slender, lower empty glumes twice as long as the upper. *F. bromoides*, Sm.

7. **F. uniglu'mis**, *L.*; panicle or spike short, branches very short, lower empty glume minute or 0, fl. glumes 4–10 shorter than the awns, flowers 2–3-androus.

Sandy sea-coasts, from Lancaster and Norfolk to Devon and Kent; E. of Ireland, local and rare; fl. June–July.—*Root* fibrous. *Stems* 4–10 in., bent below, slender, glabrous. *Leaves* setaceous, short; upper sheaths large, inflated; ligule short, auricled. *Panicle* 1½–2 in., oblong, unilateral, pale green, shining, rachis smooth; lower branches 2-nate. *Spikelets* with the awns ¾–1 in., almost subulate; fruiting cuneate; pedicels short, stout; axis smooth; empty glumes with subulate tips or awns, upper 3-nerved, broadly hyaline; fl. glumes distant, very narrow, strongly nerved, scabrid, terete below, compressed above, gradually narrowed into the subulate awn; ovary glabrous.—DISTRIB. W. Europe from Belgium, France, and Spain, S. and E. to Turkey, N. Africa.

34. BRO'MUS, *L.* BROME GRASS.

Spikelets subterete or laterally compressed, panicled or racemed, 5- or many-fld. *Empty glumes* 2, shorter than the lowest fl. glume, unequal, coriaceous, acute, awnless; lower smaller 1–3-nerved; upper 3–9-nerved. *Fl. glumes* convex or keeled, 5–7-nerved, tip entire or 2-fid. *Palea* 2-fid, nerves ciliate. *Scales* entire. *Stamens* 3, rarely 2. *Ovary* hairy at the top, styles short, inserted below the top, stigmas feathery. *Fruit* linear, grooved, oblong, adherent to the palea.—DISTRIB. Temp. and cold climates; species 50.—ETYM. The old Greek name for the *Oat*.

SECTION 1. **Schedono'rus**, *Fries*. *Lower empty glume* 1-nerved, upper 3-nerved. *Fl. glumes* distant, narrow, convex below, keeled and compressed above, 5-nerved, awn terminal. *Styles* lateral on the ovary.

* *Keels of palea pubescent only. Fl. glumes spreading in flower, erect in fruit.*

1. **B. asper**, *Murr.*; leaves flat and sheaths hairy, panicle secund nodding, fl. glumes 5–8 twice as long as the awn.

Damp woods, hedgebanks, &c., from Elgin and Cantire southwards; ascending

to 1,200 ft. in Yorkshire; fl. June–July.—Annual or perennial. *Root* fibrous. *Stem* 2–6 ft., smooth. *Leaves* ¼–½ in. diam., green, long, hairs scattered, reflexed on the sheath; ligule short. *Panicle* 3–5 in., lower branches 2–3-nate, long, lax, capillary, and rachis scabrid. *Spikelets* 1 in., narrow, glaucous green, axis scabrid; empty glumes acuminate, hairy or glabrous; fl. glumes with the awn ½–¾ in., diverging in flower, then erect, more or less hairy, lateral nerves strong, tip 2-toothed; awn variable in length.—DISTRIB. Europe, Siberia; introd. in N. America.

2. **B. erec'tus,** *Huds.*; leaves involute hairy, panicle erect narrow, fl. glumes villous twice as long as the awn.

Fields and waste places in dry soil, from Fife and Kirkcudbright southwards to Kent and Sussex; S. and Mid. Ireland, rare; fl. June–July.—Perennial. *Rootstock* stout, creeping; stolons 0. *Stems* 1–3 ft., rigid, smooth, bent below, then erect. *Leaves* narrow, rigid, almost subulate, hairy; hairs scattered on the upper sheaths, erect; ligule short. *Panicle* 4–6 in., subsimple, strict, branches 2–3-nate and rachis scabrid. *Spikelets* ⅔–1¼ in., subsolitary, green or purplish; empty glumes longer than in *B. asper;* fl. glumes much the same in both.—DISTRIB. Europe, N. Africa.

** *Annual. Keels of palea pectinate-ciliate. Fl. glumes erect both in flower and fruit* (*except* B. maximus).

3. **B. ster'ilis,** *L.*; leaves flat pilose, sheaths compressed, panicle very lax, branches few very long in ¼-whorls, spikelets subsolitary, fl. glumes 7–10 much shorter than their awns.

Fields and waste places, from Banff and Elgin southwards; fl. June–July.—*Root* fibrous. *Stem* 1–2 ft., erect, smooth, leafy. *Leaves* ⅛–¼ in. broad, flaccid, ribbed; sheaths glabrous or pubescent. *Panicle* 6–10 in. broad, nodding, very lax and open; branches horizontal and drooping. *Spikelets* with the awns 2 in., nodding, green; empty glumes long, narrow, upper twice the longest; fl. glumes very narrow, gradually narrowed into the very slender straight awn, strongly ribbed, margins hyaline.—DISTRIB. Europe, W. Siberia, N. Africa; introd. in N. America.

4. **B. madriten'sis,** *L.*; leaves narrow flat hairy, sheaths terete, panicle erect, branches few strict erect, fl. glumes 6–8, half as long as the straight stout awn.

Sandy waste places in Pembroke, Devon, Surrey, Kent, and Hants; Channel Is.; Tipperary in Ireland; a doubtful native, *Watson;* fl. June–July.—*Stems* 6–14 in., strict from an ascending base, smooth, leafy. *Leaves* ⅛–¼ in., more or less hairy or tomentose; hairs on sheaths reflexed; ligule short, truncate. *Panicle* 2–4 in., oblong, compressed; branches appressed, short, and slender rachis scabrid. *Spikelets* ½–⅔ in. excluding the awns, dull green, axis smooth; lower empty glume subulate, half as long as the narrow linear upper; fl. glumes ½ in., very narrow, scabrid, margins and 2-fid tip broadly hyaline; awn slender; stamens usually 2.—DISTRIB. Europe from France and Spain to Turkey, N. Africa.

VAR. 1, *dian'drus,* Curt. (sp.); rachis and pedicels scabrous.—VAR. 2, *rig'idus,* Roth; rachis, pedicels, and glumes pubescent. Channel Is.

5. **B. max'imus,** *Desf.*; leaves flat hairy, sheaths terete, panicle erect, branches few strict, fl. glumes 4–6 not ⅓ as long as the long straight awn.

Sandy shores, Jersey; fl. June–July.—*Root* fibrous. *Stems* 6–10 in., terete, pubescent. *Leaves* ⅛–¼ in. broad, bright green; hairs on sheaths spreading or reflexed; ligule short, truncate. *Panicle* 4–7 in., at length nodding; branches short, appressed, and rachis pubescent. *Spikelets* with the awns 2–3 in., pale green or purplish; axis glabrous; empty glumes hyaline, very narrow, awned; upper twice as long as the lower, almost equalling the lowest fl. glume; fl. glumes thin, narrow, scabrid, narrowed into the scabrid awn; nerves faint; stamens 2–3.—DISTRIB. France, Spain, Mediterranean.

SECTION 2. **Serrafal'cus,** *Parl.* Annual or perennial. *Lower empty glumes* 5-, upper 7–9-nerved. *Fl. glumes* close, convex, 5–7-nerved, 2-fid, awned in the sinus. *Palea* with pectinate-ciliate nerves. *Styles* inserted below the top of the ovary.

* *Fl. glume longer than its palea.*

6. **B. mol'lis,** *L.*; pubescent or tomentose, panicle ovoid strict, lower empty glume broadly ovate, fl. glumes 6–10 densely imbricate pubescent opaque equalling the slender awn.

Roadsides and waste places; ascending to 1,800 ft. in the N. of England; fl. May–July.—Glaucous green. *Stems* 4–24 in., terete. *Leaves* flat, ⅛–⅓ in. broad, soft, edges scabrid; sheaths terete, villous; ligule short. *Panicle* 1–3 in., erect or nodding; branches very short, subsimple. *Spikelets* ½–¾ in., compressed, oblong, tips conic; empty glumes broadly ovate, acute, strongly nerved, upper much largest; fl. glumes caducous, broadest and obtusely angled above the middle, 2-fid, pubescent.—DISTRIB. Europe, N. Africa, W. Siberia; introd. in N. America.—A glabrous variety has been called *subglaber.*

7. **B. racemo'sus,** *L.*; leaves and sheaths glabrate or hairy, panicle narrow, lower empty glume lanceolate, fl. glumes 6–10 imbricate scabrid shining equalling the slender awn. *B. pratensis,* Ehr.

Fields and waste places, from Moray southwards; ascending to 1,200 ft. in the Highlands; fl. June–July.—Very similar to *B. mollis,* but subglabrous, often 2–3 ft., rigid; leaves rigid, more ciliate; branches of panicle 3–5-nate, long and slender; spikelets narrower, more acute, scabrid; empty glumes narrower, especially the lower; fl. glume broadest above the middle, margin obtusely angled.—DISTRIB. Europe excl. Russia, N. Africa; introd. in N. America.

VAR. *commutatus,* Schrad. (sp.); stouter, panicle more compound, spikelets shorter, margins of caducous fl. glume less rounded at the broadest part.

8. **B. secali'nus,** *L.*; glabrate or sheaths hairy, panicle effuse hairy, fl. glumes 5–8 not imbricate terete scabrid longer than their awns.

Corn-fields, from Isla and Ross southwards; hardly established in Ireland; a colonist, *Watson;* fl. June–July.—*Root* of stout fibres. *Stems* 1–4 ft., strict, rigid, smooth, rarely pubescent (*B. velutinus,* Schrad. and *B. multiflorus,* Sm.). *Leaves* ⅛–⅓ in. broad, glabrous or slightly hairy, scabrid above; sheaths grooved; ligule short. *Panicle* 3–5 in., oblong; branches 3–5-nate and rachis flexuous, scabrid, subsimple. *Spikelets* ½–¾ in., compressed; empty glumes unequal, broadly oblong, scabrid, mucronate, upper larger; fl. glumes spreading, linear-oblong, 7–9-nerved, margins incurved, straight, hyaline, notched, at length coriaceous; awn variable.—DISTRIB. Europe, N. Africa, W. Siberia; introd. in N. America.

** *Fl. glume not longer than its palea.*

B. ARVEN'SIS, *L.*; leaves and sheaths hairy, panicle pyramidal effuse, branches horizontal, fl. glumes imbricate equalling the straight awn.

Introduced in various localities from Fife southwards; not naturalized; fl. July–Aug.—*Root* fibrous or creeping. *Stems* 1–2 ft., smooth. *Leaves* ⅛–¼ in. broad, flat, short, hairy beneath; sheaths grooved, pubescent; ligule obtuse. *Panicle* 4–8 in., 3–5 in. broad, branches 5–7-nate, wide-spreading, very long, capillary, scaberulous, with a few spikelets towards the tips. *Spikelets* ½ in., lanceolate, compressed, green or dull violet; axis smooth; empty glumes ovate-oblong, keel scabrid; upper much the largest, acute or shortly awned; fl. glumes ⅛ in., imbricate till quite mature, then rather distant, oblong, 2-fid, strongly nerved; awn dark.—DISTRIB. Europe.

35. CYNOSU'RUS, *L.* DOG'S-TAIL GRASS.

Spikelets fascicled and forming a unilateral spike or contracted panicle; fascicles composed of 2 or more sessile spikelets, of which the outer (involucre of authors) is deformed, being reduced to subulate pectinately arranged empty glumes; inner terete, 2–5-fld. *Empty glumes* 2, shorter than the lowest fl., unequal, spiny, herbaceous. *Fl. glumes* terete, 3-nerved, mucronate, coriaceous, opaque. *Palea* with 2 ciliate nerves. *Scales* with a basal lobe. *Stamens* 3. *Ovary* glabrous; styles short terminal, stigmas feathery. *Fruit* adherent to the fl. glume and palea.—DISTRIB. N. temp. regions; species 5.—ETYM. *κυών* and *οὐρά*, *dog's tail.*

1. **C. crista'tus,** *L.*; spike linear unilateral, fl. glumes shortly awned.

Dry pastures and banks; ascending to 1,800 ft. in the N. of England; fl. July–Aug.—Perennial. *Root* tufted, stoloniferous. *Stems* tufted, 1–2 ft., terete, strict, smooth, naked above. *Leaves* almost filiform, slightly hairy; sheaths smooth; ligule 2-fid. *Spike* 1–2 in., strict, rigid; rachis flexuous; branches pectinate; spikelets ⅛ in., sessile between 6–10 rigid scabrid serrulate concave segments, and as long as these; empty glumes cuspidate; fl. glumes scabrid above, obscurely 3-nerved.—DISTRIB. Europe, N. Africa.

2. **C. echina'tus,** *L.*; panicle dense, awn equalling the fl. glume.

Sandy sea-shores, Channel Is.; introduced on the British coasts; fl. July.—Annual; larger and more robust than *C. cristatus;* leaves broad, flat; panicle ¾–1½ in., ovoid, lobed, squarrose, shining; branches ½ in., pectinate; segments of branches ¼–½ in., subulate, slender, scarious, scaberulous; spikelets fewer on each branch, ¼ in. *Empty glumes* hyaline; fl. glumes green.—DISTRIB. Mid. and S. Europe, N. Africa, W. Asia.

36. BRACHYPO'DIUM, *Beauv.*

Spikelets subsessile, distichous, terete, spiked, inserted broadside to the rachis, very many-fld. *Empty glumes* 2, rarely 1, much shorter than the flowering, straight. *Fl. glumes* densely imbricate; awn terminal or 0, nerves converging to the tip. *Palea* with ciliate nerves. *Scales* 2, ovate. *Stamens* 3. *Ovary* hairy at the top; styles distant, stigmas feathery. *Fruit* adhering to the palea.—DISTRIB. Europe, temp. Asia, N. Africa; species 12.—ETYM. *βραχύς* and *ποδιόν*, from the *subsessile* spikelets.

1. **B. sylvat'icum,** *R. and S.*; root fibrous, leaves broad hirsute, spike drooping, awn equalling its fl. glume.

Copses, hedgerows, &c.; ascending to 1,000 ft. in the N. of England; fl. June-July.—Perennial. *Stems* 1–3 ft., very slender, terete, inclined, leafy. *Leaves* ⅛–¼ in. broad, flat, bright green, ciliate; sheaths terete; ligule obtuse. *Spike* 2–6 in.; rachis flattened, smooth, slender. *Spikelets* 8–18, 1–2 in., appressed, linear, very shortly pedicelled, hirsute, green; empty glumes cuspidate, strongly 3–5 nerved; fl. glumes 8–10, ⅓ in., linear-oblong, nerves strong, tip acuminate awned; palea ciliate at the tip, equalling the glume.—DISTRIB. Europe, N. Africa, N.W. Himalaya.

2. **B. pinna'tum**, *Beauv.*; rootstock creeping, leaves narrow involute, spike erect, awn shorter than its fl. glume.

Downs, hedgerows in chalky soil, from York to Devon and Kent; absent from Ireland; fl. July.—Glaucous. *Stems* 1–3 ft., very slender, terete, naked, smooth. *Leaves* rigid, almost glabrous, terete, rarely flat; ligule ciliate. *Spike* 1–6 in., rachis flattened, smooth. *Spikelets* ¾–1½ in., erect, curved away from the rachis, glabrous or nearly so, green and purplish; empty and fl. glumes much as in *B. sylvaticum*, but glabrous or nearly so, and tips of the latter suddenly contracted into the short awn.—DISTRIB. Europe, N. Africa, Siberia.

37. TRITICUM, *L.*

Spikelets solitary, sessile, distichous, compressed, spiked, inserted broadside to the rachis, 3-many-fld. *Empty glumes* 2, shorter than the flowering, unequal. *Fl. glumes* herbaceous, rigid, many-nerved, awned or not. *Palea* with ciliate nerves. *Scales* ovate, entire, ciliate. *Stamens* 3. *Ovary* hairy at the top; stigmas distant, subsessile. *Fruit* grooved, usually adherent to the palea.—DISTRIB. All temp. climates; species 20.—ETYM. The classical name.

1. **T. cani'num**, *Huds.*; root fibrous, stolons 0, empty glumes 3–5-ribbed, fl. glumes 2–5-awned.

Woods, banks, and waste places; ascends to 1,300 ft. in Yorkshire; fl. July.—Bright green. *Stems* 1–3 ft., slender. *Spike* 2–10 in., very slender, often flexuous and nodding; rachis with scabrid edges. *Spikelets* ½–¾ in., green, rather slender; pedicel very short, pubescent or glabrous; empty glumes scabrid, cuspidate or shortly awned, nerves usually 3, very firm; fl. glumes linear-lanceolate, smooth except at the 5-nerved tip; awn scabrid, longer or shorter than the palea.—DISTRIB. Europe, Siberia, Himalaya, N. America.

2. **T. re'pens**, *L.*; rootstock creeping, empty glumes 5-ribbed, fl. glumes 4–5 rigid cuspidate or acuminate rarely awned. *T. alpinum*, Don MS.

Fields and waste places; ascends to 1,300 ft. in the N. of England; fl. June-Aug.—Excessively variable. *Rootstock* stout, long, creeping, jointed. *Stems* 1–4 ft., bent and ascending, smooth, glabrous. *Leaves* very variable, flat or involute, usually scabrid above and glabrous beneath, sometimes hairy; sheaths terete; ligule very short. *Spike* 2–10 in., rigid, slender or robust, strict or curved, not nodding, rachis glabrous or pubescent. *Spikelets* ¾–1 in., very rigid; empty glumes acute obtuse or notched, rigid short points or awns of variable length; fl. glumes quite similar, but nerved only at the tip, awn nearly as long as the glume.—DISTRIB. Europe, N. Africa, N. Asia, Himalaya, N. America.—*T. caninum*, var. *biflorum*, Mitt. (*T. alpinum*, Don MSS.), found on Ben Lawers, and said to want the creeping rootstock, is only *T. repens*.

VAR. 1, *littoré'um*, Schum. (sp.); glaucous, leaves involute, rachis of spike smooth. *T. littorale*, Host. Intermediate between *T. repens* and *junceum*. Sea-shores.—VAR. 2, *nemora'le*; rootstock less creeping, spike more slender, rachis often pubescent, spikelets narrower, awns longer. Woods, &c. Very like *T. caninum*, but creeping and glumes 5-ribbed.

3. **T. jun'ceum**, *L.*; rootstock creeping, spike fragile, spikelets large shining, empty glumes 5–11-ribbed, fl. glumes 4–10 obtuse acute notched or truncate rarely mucronate.

Sandy sea-shores; fl. July–Aug.—Often glaucous, rigid, forming dense masses. *Rootstock* stout, extensively creeping. *Stems* bent below, ascending, smooth, sheathed at the base. *Leaves* coriaceous, involute, pubescent above, glabrous beneath; sheaths smooth, rather inflated; ligule short. *Spike* 2–4 in., stout, curved; rachis very stout, smooth. *Spikelets* ¾–1¼ in., distant, very stout, pale, rigidly coriaceous, smooth, shining; empty glumes strongly or faintly nerved; flowering obscurely so.—DISTRIB. Europe, N. Africa, N. America?—A most variable grass. The above diagnosis refers to its more typical state; the following sub-species diverge towards *T. repens*, var. *littoreum*, under which they had best perhaps be placed.

Sub-sp. ACU'TUM, *DC.* (sp.); ascending, leaves scabrid, empty glumes 5–7-ribbed obtuse, flowering 5–8 obtuse mucronate or shortly awned.

Sub-sp. PUN'GENS, *Pers.* (sp.); suberect, leaves very scabrid pungent, spikelets much smaller, empty glumes shorter stoutly 7–9-ribbed, flowering 5–12 acute.

38. LO'LIUM, *L.* RYE-GRASS.

Characters of *Triticum*, but upper empty glume absent except in the terminal spikelet; lower persistent, facing the rachis.—DISTRIB. N. temp. regions; species 4.—ETYM. An old Latin name.

1. **L. peren'ne**, *L.*; rootstock perennial, empty glume shorter than the 8–15-fld. spikelet, awns short or 0.

Waste places; ascending to 1,600 ft. in the N. of England; fl. May–June.—*Root* fibrous, stolons leafy. *Stems* 18 in., bent below, ascending, smooth, slightly compressed. *Leaves* flat, edges and upper surface scabrid; sheaths smooth, compressed; ligule short. *Spike* 4–10 in., strict, very slender; rachis smooth, channelled on one side: *Spikelets* ⅓–½ in. (much longer in var. *italicum*), quite smooth, shining; empty glumes strongly ribbed, linear-lanceolate, fl. glume linear-oblong, terete, obtuse or cuspidate or awned, ribbed.—DISTRIB. Europe, N. Africa, W. Asia; introd. in N. America.—*L. italicum*, *A. Br.*; *L. multiflorum*, Lamk.; and *L. perenne*, var. *aristatum*, are cultivated annual or biennial forms of this species, with many flowers, not known in a wild state.

2. **L. temulen'tum**, *L.*; annual, empty glume equalling or exceeding the 5–7-fld. spikelets, awn long. *Darnel.*

Corn-fields, from Isla and Elgin southwards; a colonist, *Watson*; fl. June–Aug.—Very similar to *L. perenne*, but always annual, without stolons, empty glume longer, and flowering glumes more turgid.—DISTRIB. Europe, N. Africa, W. Siberia, India; introd. in N. America.—Very poisonous.

VAR. *arven'se*, With. (sp.); awn short or 0. *L. linicola*, Sond.

39. LEPTU'RUS, *Br.*

Spikelets solitary, sessile, distichous, alternate in a small spike, placed broadside to and in excavations of the jointed rachis, 1-fld. *Empty glumes* 2 (rarely 1) enclosing the flowering, equal, hard, coriaceous, ribbed, placed in front of the spikelet, except in the terminal one. *Fl. glume* keeled. *Palea* 2-nerved. *Scales* glabrous, entire. *Stamens* 3. *Ovary* glabrous; stigmas sessile distant and terminal, feathery. *Fruit* free.—DISTRIB. Europe, N. and S. Africa, Australia; species 7.—ETYM. λεπτός and οὐρά, from the *slender tail*-like spikes.

1. **L. filifor'mis,** *Trin.*; annual, glabrous, spike slender.

Waste places by the sea, from Linlithgow southwards; all round Ireland; fl. July.—*Root* fibrous. *Stems* 4–10 in., bent or curved below, ascending, stout or slender, shining, terete, leafy. *Leaves* short, coriaceous, scaberulous, soon involute; sheaths slightly compressed, smooth, upper inflated; ligule very short, auricled. *Spike* 2–6 in., straight or curved, short or long; rachis rigid, grooved, hollowed on one side. *Spikelets* ¼ in., green, appressed or spreading; empty glumes rather oblique, linear-oblong, pointed; fl. glumes with 1 green nerve; palea with glabrous keels.—DISTRIB. Europe from Gothland southwards, excl. Russia, N. Africa.

VAR. 1, *filifor'mis* proper; stem and spike slender, the latter nearly straight.—VAR. 2, *incurva'tus*, Trin. (sp.), stem and spike stouter, the latter strongly curved.

40. EL'YMUS, *L.* LYME GRASS.

Spikelets 2–3-nate, sessile, distichous, compressed, spiked, inserted broadside to the rachis, 2–7-fld. *Empty glumes* 2, equalling or exceeding the flowering, equal, placed in front of the spikelet. *Fl. glumes* 5-nerved, coriaceous, awned or not. *Palea* with 2 ciliate keels. *Scales* ovate, usually ciliate. *Stamens* 3. *Ovary* hirsute; stigmas sessile distant feathery. *Fruit* adnate to the fl. glume and palea.—DISTRIB. N. temp. regions; species 22.—ETYM. ἑλύω, the fruit being *rolled up* in the palea.

1. **E. arena'rius,** *L.*; fl. glumes rigid acuminate, awn 0.

Sandy sea-shores, from Essex and N. Wales northwards; fl. July.—Perennial, glaucous. *Rootstock* stout, creeping, stoloniferous. *Stems* 3–6 ft., very stout, smooth, terete. *Leaves* rigid, strict, pungent, ½–¾ in. diam.; sheaths smooth, grooved; ligule very short. *Spike* 6–12 in., stout, strict, rachis flexuous, plano-convex, hirsute. *Spikelets* 1 in., imbricate, appressed; axis stout, pubescent; empty glumes linear-lanceolate, purplish; fl. glumes 1–3, lanceolate, ciliate and hirsute, keeled towards the cuspidate tip; palea as long as the glume.—DISTRIB. Europe, N. Asia, N. America.

41. HOR'DEUM, *L.* BARLEY.

Spikelets 3-nate, subsessile, distichous, compressed, spiked, inserted broadside to the rachis, 1-fld., with often the subulate rudiment of a 2d fl. glume; lateral spikelets, rarely the central, male or 2-sexual. *Empty glumes* 2, exceeding the flowering or not, equal, collaterally placed in front of the spikelet, awned. *Fl. glume* awned. *Palea* as long, narrow, with 2 keels. *Scales* 2, ciliate. *Ovary* hirsute; stigmas 2, subsessile, feathery. *Fruit* adherent to the palea.—DISTRIB. N. temp. and warm regions, S. America; species 10.—ETYM. The old Latin name.

* *Flowers of lateral spikelets 2-sexual, of middle male.*

1. **H. sylvat'icum,** *Huds.*; perennial, spike subterete, empty glumes setaceous scabrid. *Elymus europæus*, L.

Copses and woods in chalky soil, from Chester and Northumberland to Wilts and Kent; Dublin (native?) only in Ireland; fl. June–July.—Perennial, bright green. *Stems* 1–3 ft., strict, erect, smooth. *Leaves* ⅛–⅜ in. broad, flat, thin, scaberulous; sheaths hispid, hairs reflexed; ligule very short. *Spikes* 2–4 in., strict, erect, terete, green. *Spikelets* ⅜ in., erect, subsessile; empty glumes subulate, awned, scabrid, 3-nerved; fl. glumes linear-oblong, dorsally compressed, scabrid, shorter than the straight flexuous awn, nerved towards the tip; palea with smooth keels. *Fruit* very narrow.—DISTRIB. Europe from Gothland to Spain, Italy, and Russia.

** *Lateral spikelets flowerless or male, middle 2-sexual.*

2. **H. praten'se,** *Huds.*; perennial, spike compressed, outer empty glume setaceous scabrid.

Wet meadows, &c.; E. of Scotland from Forfar and Perth to Devon and Kent; S. and E. of Ireland, local; fl. June-July.—*Rootstock* creeping. *Stems* very slender, 1–2 ft., terete, scabrid above. *Leaves* ⅛–⅛ in., narrow, flat, at length involute, scabrid above, hairy beneath, as are the narrow sheaths; ligule very short. *Spike* 1–3 in., ¼–½ in. broad, inclined, linear, yellow-green. *Spikelets* with the awns ⅜ in., rather spreading, scabrid all over, not ciliate; fl. glumes terete, smooth, about equalling the awn, obscurely nerved; palea as long, acute, keels not ciliate.—DISTRIB. Europe from Gothland to Spain and Russia, Siberia, Dahuria, N.W. India, N. America.

3. **H. murl'num,** *L.*; annual, spike compressed, outer empty glume of the mid. spikelet lanceolate ciliate, of the lateral setaceous scabrid. *Way-bent, Barley-grass.*

Waste places, E. of Scotland from Kincardine to Kent and Cornwall; S. and E. of Ireland, very rare; fl. June-July.—*Root* fibrous. *Stems* ascending, 6–18 in., smooth, glabrous. *Leaves* small, narrow, scabrid; sheaths inflated, glabrous; ligule very short. *Spikes* 1½–2 in., stout, inclined, green. *Spikelets* 1 in., densely imbricate; empty glumes filiform; fl. glumes lanceolate, flattened, much shorter than the straight awn; palea with distantly ciliate keels.—DISTRIB. Europe from Gothland southwards, N. Africa.

4. **H. marit'imum,** *With.*; annual, spike subterete, empty glumes scabrid, upper of the mid. spikelet ½-lanceolate, the rest setaceous. *Squirrel-tail Grass.*

Waste maritime localities, from Chester and Durham southwards; absent from Ireland; fl. June.—*Stems* 6–12 in., bent below, then erect, terete, smooth, leafy. *Leaves* short, straight, narrow, flat, glaucous, scabrid; lower sheaths pubescent, upper inflated; ligule very short. *Spike* 1–2 in., stout, erect, subterete, at length yellow-brown. *Spikelets* ⅛ in. without the awns, rather spreading, rigid; larger empty glume of mid. spikelet green with scarious margins, shorter than the rigid awn; fl. glume lanceolate, flattened, about equalling the rigid awn.—DISTRIB. Europe from Denmark southwards, N. Africa.

CLASS III. ACOTYLE'DONES OR CRYPTOGAMS.

DIVISION I. VASCULA'RES.

ORDER I. FIL'ICES.

Herbs, rarely shrubby or arborescent, with fibrous roots, or perennial short or long and creeping rootstocks. *Leaves* (*fronds*) tufted or alternate on the rootstock, simple pinnatifid or 1-4-pinnate, usually circinate in vernation; petiole (*stipes*) sometimes jointed at the base and rachis grooved on the upper surface. *Fructification* of microscopic *spores*, contained in usually minute *capsules* that are collected in masses (*sori*) on the under surface or edge of the frond, or rarely on separate fronds or parts of the frond, and are naked or covered with an involucre formed of or upon the margin or back of the frond. *Capsules* membranous, sessile or stalked, often mixed with jointed club-shaped hairs or imperfect capsules. *Spores* usually obtusely 4-hedral.—DISTRIB. Chiefly humid temp. and trop. regions; genera 75; species 2,500.—AFFINITIES. With *Lycopodiaceæ*.

In germination the spore bursts, and develops a flat cellular scale (*prothallus*), on the under surface of which are formed cavities some containing male and some female organs. The *male cavities* (*antheridia*) contain sperm-cells (*spermatozoids* or *antherozoids*), which enclose a spiral filament. The *female cavities* (*archegonia*) contain a solitary free *germ-cell*. The antherozoids find their way into the archegonia and fertilize the germ-cell, which thereupon develops into a plant, the prothallus withering away.

TRIBE I. **HYMENOPHYL'LEÆ.** *Frond* very membranous, translucent, reticulate. *Involucre* 2-valved, urceolate or 2-lipped. *Capsules* minute, membranous, reticulate, sessile on a clavate or filiform receptacle, girt by a complete horizontal or oblique ring. *Vernation* circinate.

Involucre 2-valved.....1. Hymenophyllum.
Involucre urceolate.....2. Trichomanes.

TRIBE II. **POLYPO'DIEÆ.** *Frond* more or less coriaceous, opaque. *Involucre* marginal or dorsal or 0. *Capsules* minute, membranous, reticulate, not raised on an elevated receptacle, stalked, partially girt by a vertical ring, bursting transversely. *Vernation* circinate.

* *Sori* marginal; involucre continuous with the reflexed or recurved margin of the frond.

Sori oblong, short.....3. Adiantum.
Sori linear, continuous. Fronds all similar.....4. Pteris.
Sori oblong, on special fronds.....5. Cryptogramme.
Sori linear, on special fronds.....6. Lomaria.

** *Sori* dorsal, linear; involucre linear.

Involucre on a nerve, single.....7. Asplenium.
Involucre on a nerve, double.....8. Scolopendrium.

*** *Sori* dorsal, globose; involucre short.

Involucre lacerate, attached under the sorus.....9. Woodsia.

Involucre hooded, on one side of the sorus .....10. Cystopteris.
Involucre orbicular, peltate, superior .....11. Aspidium.
Involucre reniform, superior .....12. Nephrodium.
**** *Sori* dorsal; 0 involucre (see *Ceterach* under *Asplenium*).
Sori globose or oblong .....13. Polypodium.
Sori linear .....14. Gymnogramme.

TRIBE III. **OSMUN'DEÆ.** *Frond* coriaceous or membranous. *Involucre* 0. *Capsules* sessile or shortly stalked, vertically 2-valved, with a short lateral or subterminal striate areola. *Vernation* circinate .....15. Osmunda.

TRIBE IV. **OPHIOGLOS'SEÆ.** *Capsules* large, 2-valved, without a ring or areola, coriaceous, in spikes or panicles. *Vernation* straight.

Frond ovate, simple. Capsules spiked .....16. Ophioglossum.
Frond pinnate. Capsules panicled .....17. Botrychium.

1. HYMENOPHYL'LUM, *Sm.* FILMY-FERN.

Rootstock filiform or capillary, creeping. *Fronds* usually matted and 2-4-pinnatifid or -pinnate, pellucid, reticulate; segments with a midrib; veins 0. *Sori* marginal, axillary or terminal; involucre free or sunk in the frond, 2-valved or 2-lipped, opening outwards; capsules sessile on a columnar receptacle; ring complete, oblique.—DISTRIB. Chiefly trop. and S. temp. regions; species 70.—ETYM. ὑμήν and φύλλον, from the membranous fronds.

1. **H. tunbridgen'se,** *Sm.*; frond ovate pinnate below pinnatifid above, pinnæ spreading spinulose-serrate, lips of involucre toothed.

Moist shaded rocks or copses, from Mull and Argyle southwards, and in Ireland, rare; Channel Is.; ascends to 1,000 ft. in Cornwall; frt. June–July.—*Rootstocks* capillary, interlaced. *Stipes* 1–2 in., winged above. *Frond* 1–3 in., glabrous; pinnæ distichous, flabellately pinnatifid, lobes linear; involucre solitary, axillary, suborbicular, lips strongly irregularly toothed.—DISTRIB. Belgium, France, Germany, Italy, Canaries, S. temp. regions.

2. **H. unilatera'le,** *Willd.*; frond oblong pinnate below or throughout, pinnules decurved spinulose-serrate, lips of involucre entire. *H. Wilsoni,* Hook.

Shaded rocks and copses, extending to Orkney and Shetland, and in Ireland; ascending to 2,800 ft. in the Hebrides; frt. June–July.—Very near *H. tunbridgense,* and perhaps only a sub-species, but more rigid, darker green; involucre more ovoid and turgid; pinnæ pinnatifid chiefly on the upper side.—DISTRIB. As *H. tunbridgense.*

2. TRICHOM'ANES, *L.* BRISTLE-FERN.

Rootstock creeping or tufted, stout or slender. *Fronds* erect or pendulous, simple pinnate or 1–4-pinnatifid, usually pellucid, reticulate; segments with 1 stout simple or forked midrib. *Sori* marginal, axile or terminal; involucre elongate, free or sunk in the frond, tubular or campanulate, mouth entire or 2-lipped, opening outwards; capsules sessile on a long often exserted receptacle.—DISTRIB. Chiefly trop. and damp warm climates; species 78.—ETYM. Obscure.

1. **T. radi'cans,** *Sw.*; rootstock creeping, frond 2–3-pinnatifid.

Wet shaded rocks, S. and S.W. of Ireland, local; formerly at Bingley, York-

shire; lately found in Wales; frt. July–Sept.—*Rootstock* slender, wiry, extensively creeping, tomentose. *Stipes* 2–6 in., stout, wiry, ascending, naked below, winged above. *Frond* 4–12 in., membranous, firm; rachis winged; lower pinnæ 1–4 in., rhomboid-ovate; pinnules the same shape, pinnatifid, toothed, nerves 1 to each segment. *Sori* lateral, 1–4 to each pinnule; tube of involucre short, lips small; receptacle exserted.—DISTRIB. W. Europe, trop. Africa and America, Himalaya, Japan, Polynesia.

VAR. 1, *speciosum*, Willd. (sp.); fronds deltoid, involucre scarcely winged. *T. brevisetum*, Br.; *Hymenophyllum alatum*, Sm.—VAR. 2, *Andrewsii*, Newm. (sp.); frond lanceolate, involucres many winged, receptacle larger. Kerry.

3. ADIAN'TUM, *L.* MAIDEN-HAIR.

Rootstock tufted or creeping. *Fronds* compound, 2–4-pinnate, rarely simple; rachis and petioles capillary; veins forked or netted. *Sori* rounded or oblong, parallel with and on the margin; involucre formed of the reflexed often kidney-shaped coriaceous margin of the frond, opening inwards, surface veined.—DISTRIB. All temp. and hot climates; species 62. —ETYM. The old Greek name.

1. **A. Capil'lus-Ven'eris,** *L.*; frond 3–4-pinnate, pinnules cuneate lobed crenate glabrous.

Damp rocks, walls, &c., especially near the sea, rare and local, Dorset to Cornwall, I. of Man, Glamorgan; W. of Ireland, local; frt. May–Sept.—*Rootstock* creeping, scaly. *Stipes* 4–9 in., slender, black, polished, naked. *Frond* 4–12 in., ovate, with a short terminal and many spreading capillary branches, the lower pinnate; pinnules ½–1 in., membranous, outer edge rounded; petioles ¼ in.; veins repeatedly forked. *Sori* in the crenatures of the pinnules; involucre subreniform.—DISTRIB. Europe from France southwards, W. Asia, N. S. and trop. Africa, W. Siberia, India, Himalaya, trop. and subtrop. America, Polynesia.

4. PTE'RIS, *L.* BRAKE or BRACKEN.

Rootstock usually creeping. *Fronds* various; veins free, forked or netted. *Sori* continuous; involucre scarious or membranous, confluent with the recurved margin of the frond, not recurved in age.—DISTRIB. All regions; species 80.—ETYM. πτερόν, from the *wing*-like fronds.

1. **P. aquili'na,** *L.*; frond coriaceous 3–4-pinnate, veins free.

Forests, heaths, moors, &c.; ascending to nearly 2,000 ft. in the Highlands; frt. July–Aug.—*Rootstock* stout, subterranean, extensively creeping. *Stipes* 1–6 ft., stout, erect, pale, dark at the base. *Frond* 2–3 ft.; rachis glabrous or pubescent; upper pinnæ simple, next cut into linear pinnules, lower petioled, 1 ft. or more, again pinnate; pinnules 1 in., sessile, auricled at the base; veins close, 1–2-forked. *Involucre* glabrous villous or ciliate, sometimes double, inner very narrow.—DISTRIB. Arctic Europe and all temp. and many trop. regions.

5. CRYPTOGRAM'ME, *Br.* PARSLEY-FERN, ROCK-BRAKE.

Rootstock tufted, often elongate. *Fronds*, outer barren, inner fertile, 2–4 pinnatifid; veins forked, free. *Sori* terminal on the veins, subglobose, afterwards confluent along the margins of the fertile pinnules; involucre membranous, continuous with the recurved margin of the frond, spreading

in age.—DISTRIB. N. temp. and arctic regions, W. Asia, Himalaya; species 1.—ETYM. *κρύπτος* and *γραμμή*, from the *concealed* sori.

1. **C. cris'pa,** *Br.*; fertile pinnules fusiform. *Allosorus,* Bernh.

Loose stony places in mt. districts, from Harris and Sutherland to N. Devon; ascending to nearly 3,500 ft. in the Highlands; E. and N.E. of Ireland, very rare; frt. June–July.—*Rootstock* scaly, clothed with broken bases of fronds. *Stipes* of barren fronds 1–2 in., of fertile 2–5 in., slender, naked, pale brown. *Fronds* deltoid-ovate, submembranous; barren 2-pinnate; pinnules 2–3-pinnatifid, cuneate or oblong, 2–3-toothed; fertile 2–3-pinnate; pinnules fusiform or oblong-lanceolate, obtuse, entire, subpetioled.

6. LOMA'RIA, *Willd.* HARD-FERN.

Rootstock usually short or creeping. *Fronds* tufted, of 2 kinds; outer barren or fertile below only; inner fertile; veins free, simple or forked. *Sori* linear, close to the margin, continuous round the pinnule, often covering its lower surface; involucre linear, close to and parallel with the margin, opening inwards, scarious.—DISTRIB. Trop. and temp. chiefly South regions; species 40.—ETYM. *λώμα*, from the marginal sori.

1. **L. Spi'cant,** *Desv.*; barren fronds narrow-lanceolate pinnatifid above pinnate below. *Blechnum boreale,* SW.

Heaths, woods, banks, &c.; ascending to nearly 2,000 ft. in the Highlands; frt. July–Aug.—*Rootstock* stout, creeping, scaly. *Stipes* of barren fronds 2–3 in., of fertile 6–9 in., polished, red-brown. *Fronds* erect or spreading; barren 6–9 in., narrowed to the base, coriaceous, green, glabrous; pinnules ½–¾ in., linear-oblong, sessile by a broad base, obtuse, quite entire, sinus narrow, veins inconspicuous; fertile pinnate, pinnæ distant, falcate, narrow, obtuse, dilated at the base, lower minute very distant. *Involucre* close to the margin in a young state.—DISTRIB. Europe (Arctic), Canaries, N.E. Asia, Japan, N.W. America.

7. ASPLE'NIUM, *L.* SPLEENWORT.

Rootstock usually short, tufted. *Fronds* various. *Sori* dorsal on the veins, linear or oblong, oblique, distant from the midrib, except when the frond is much divided; involucre oblong or linear, membranous, laterally attached to the vein, opening towards the midrib.—DISTRIB. All climates but very cold; species 280.—ETYM. *a* and *σπλήν*, having been a reputed *splcen* medicine.

SUB-GEN. 1. **Asple'nium** proper. *Involucre* straight, narrow, margin entire or erose. *Frond* not scaly beneath. *Veins* free.

* *Ultimate pinnules without a distinct midrib.*

1. **A. Ru'ta-mura'ria,** *L.*; frond oblong or ovate rigid irregularly 2-pinnate, pinnæ 3–7 obovate-cuneate, tip rounded or truncate toothed.

Walls and rocks; ascending to nearly 2,000 ft. in the Highlands; frt. June–Oct.—*Rootstock* stout, shortly creeping, without scales. *Stipes* tufted 2–4 in., wiry, black below. *Fronds* 1–2 in., recurved, often deltoid; pinnæ petioled, upper entire, lower again pinnate; pinnules ⅓–½ in., often rhomboid; midrib obsolete; veins flabellate, forked. *Sori* many, linear-oblong, 2–5 on each pinnule; involucre entire or margins erose.—DISTRIB. Europe (Arctic), N. and S. Africa, Siberia, N. Asia to the N.W. Himalaya, N. America.

2. **A. germanʹicum,** *Weiss;* frond oblong-lanceolate pinnate, pinnæ few distant alternate cuneate-lanceolate simple toothed or lobed. *A. alternifolium,* Wulf.

Rocks, very rare, Wales, N. of England, Roxburgh, Perth, and Fife; absent from Ireland; frt. June–Sept.—*Rootstock* densely tufted, creeping, without scales. *Stipes* 2–4 in., very many, slender, erect, black below. *Fronds* rather flaccid, 2–3 in.; pinnæ 7–9, ½–¾ in., very variable in form, sometimes fan-shaped, lower shortly petioled, irregularly 2–3-lobed; lobes crenate or toothed; midrib obsolete, veins forked. *Sori* 2–4 on each pinna or segment, parallel, linear-oblong; involucre entire, at length covering the breadth, but not the length of the segments.—DISTRIB. Europe, excl. Greece and Turkey.

3. **A. septentrionaʹle,** *Hull;* frond linear-lanceolate inciso-pinnatifid, pinnæ narrow erect, tips incised.

Walls and rocks, rare, N. Devon, Wales; ascending to about 3,000 ft. northwards to Perth and Aberdeen; absent from Ireland; frt. June–Oct.—*Rootstock* densely tufted, hardly scaly. *Stipes* many, 3–4 in., erect, rigid, black below. *Frond* coriaceous, 1–2 in., lanceolate, simple or cleft into slender subpetioled segments; midrib obsolete; veins forked. *Sori* 1–4 on each pinna, parallel, at length covering the pinna; involucre narrow.—DISTRIB. Europe, Siberia, W. Asia to the Himalaya, N. America.

** *Ultimate pinnules with a distinct midrib.*

4. **A. Trichomʹanes,** *L.*; fronds linear pinnate, rachis rigid chesnut-brown, pinnæ ¼–⅔ in. many subsessile.

Walls and rocks; ascending to nearly 2,000 ft. in Wales; frt. May–Oct.—*Rootstock* stout, shortly creeping; scales few, subulate, blackish. *Stipes* 1–4 in., crowded, naked, polished, red-brown, black below. *Frond* 6–12 in., rigid; pinnæ 15–40, horizontal, dark green, lower smaller, base obliquely cuneate truncate rounded or auricled, sometimes incised; midrib subcentral; veins few, oblique, forked above the middle. *Sori* oblique, short; involucre pale brown, entire or erose.—DISTRIB. Europe, N. Africa, N. and W. Asia, N. America, S. temp. regions.—Var. *anceps,* Sol. (sp.), is simply a larger form.

5. **A. virʹide,** *Huds.*; fronds linear pinnate, rachis green slender, pinnæ ¼–½ in. many subpetiolate rhombic-ovate crenate.

Wet rocks in mt. districts, from S. Wales northwards; ascending to nearly 2,800 ft. in the Highlands; W. of Ireland; frt. June–Sept.—Allied to *A. Trichomanes,* of which it may be regarded as an alpine sub-species, distinguished by its more flaccid habit, pale rachis, shorter paler and subpetioled pinnæ.—DISTRIB. Europe (Arctic), Siberia, W. Asia, N. America.

6. **A. marʹinum,** *L.*; frond oblong or lanceolate coriaceous pinnate below, pinnæ 1–2 in. oblong-ovate crenate.

Sea-cliffs and caves; frt. June–Sept.—*Rootstock* stout, inclined, clothed with purple-brown chaffy scales. *Stipes* 3–6 in., many, red-brown below, stout, polished. *Frond* 3–10 in., coriaceous; rachis stout, winged, green; pinnæ few or many, acute or obtuse, base truncate cuneate or cordate, auricled above, margin sinuate-lobed or serrate, upper confluent; midrib and forked veins obscure. *Sori* large, oblique; involucre coriaceous.—DISTRIB. France, Spain, Italy, N. Africa, Brit. N. America.

7. **A. lanceola'tum,** *Huds.*; frond broadly lanceolate membranous 2-pinnate, pinnules broad crowded acutely serrate.

Wet rocks, from N. Wales and Gloucester southwards; Cork only in Ireland; frt. June-Sept.—*Rootstock* short, stout, clothed with subulate scales. *Stipes* 2–4 in., chesnut-brown, glossy. *Frond* 6–9 in., bright green; pinnæ many, shortly petioled, lower smaller distant, cut to the rachis into broad acutely-toothed crowded ovate or obovate pinnules; veins forked. *Sori* short, at length confluent.—DISTRIB. Europe from France, Spain, and Germany to Turkey, N. Africa.

8. **A. Adian'tum-ni'grum,** *L.*; frond deltoid-ovate 2–3-pinnate, pinnules petioled inciso-pinnatifid and serrate.

Banks, rocks, and walls; ascending to 1,900 ft. in the Highlands; frt. June-Oct.—*Rootstock* stout, oblique, scales subulate. *Stipes* 6–9 in., almost naked, polished, chesnut-brown. *Fronds* 6–12 in., coriaceous; rachis brown below, winged and compressed above; pinnæ polished, ovate-lanceolate, pinnules ⅓–⅔ in.; veins pinnate and forked. *Sori* copious, short, crowded, at length confluent; involucre free, pale brown, edges entire.—DISTRIB. Europe, N. Africa, W. Siberia, W. Asia to the Himalaya.

VAR. *acu'tum,* Bory (sp.); lower pinnæ triangular acuminate, segments narrow, very acute.

SUB-GEN. 2. **Athy'rium,** *Roth* (gen.). *Involucre* short, oblong or obliquely reniform, reflexed after dehiscence, margin laciniate. *Frond* not scaly beneath; veins free.

9. **A. Fi'lix-fœm'ina,** *Bernh.*; frond large membranous oblong-lanceolate 2–3-pinnate, pinnules very many close-set subsessile oblong serrate.

Moist woods, rocky places, &c.; ascending to 2,200 ft. in the N. of England; frt. July-Aug.—*Rootstock* stout, ascending, often 6–8 in., clothed with broad ferruginous scales. *Stipes* 6–12 in., stout, copiously scaly below, brittle, brown or pale yellow. *Frond* 1–5 ft., bright green, flaccid, waving; pinnæ sessile, close-set, lanceolate, acuminate, spreading and ascending; pinnules ½–¾ in., sessile, spreading, obtuse, lower pinnatifid, upper coarsely serrate; veins pinnate in the segments. *Sori* many, small; involucre variously curved, membranous, very convex, margin fringed or erose.—DISTRIB. Europe (Arctic), N., S., and trop. Africa, N. Asia, W. Asia to the Himalaya, N. and trop. America.

VAR. 1, *Fi'lix-fœm'ina* proper; frond 2-pinnate, pinnules separate pinnatifid obtuse, basal shorter, sharply toothed at the sides and tip. *Athyrium latifolium,* Bab.—VAR. 2, *rhæ'ticum,* Roth. (sp.); frond 2-pinnate, pinnules narrow convex toothed, basal longest. Var. *convexum,* Newm.—VAR. 3, *mol'le,* Roth. (sp.); stipes short, frond small pinnate, pinnules oblong flat confluent below less toothed.—VAR. 4, *inci'sum,* Hoffm. (sp.); frond very large 3-pinnate, pinnæ broad, lower pinnules again pinnate flat toothed.

SUB-GEN. 3. **Ce'terach,** *Willd.* (gen.). *Involucre* almost obsolete. *Frond* covered with chaffy scales beneath. *Veins* anastomosing. *Hemidictyum,* Presl.

10. **A. Ce'terach,** *L.*; frond pinnatifid. *Ceterach officinarum,* Desv.

Rocks and walls, especially in the W. counties, from Argyle and Perth southwards; and in Ireland; frt. April-Sept.—*Rootstock* short, stout. *Stipes* 1–3 in., wiry, blackish, chaffy. *Frond* 4–6 in., erect or spreading, leathery,

linear-lanceolate or oblong, bright opaque green above, beneath densely clothed with rusty ovate toothed scales; segments ⅛–½ in., horizontal, broadly ovate or oblong, quite entire, lower segments free; sinus broad, deep, rounded. *Sori* linear, hidden under the scales; involucre a very narrow membrane, or a mere ridge on the swollen nerve.—DISTRIB. Europe from Belgium southwards, N. Africa, W. Asia to the N.W. Himalaya.

8. SCOLOPEN'DRIUM, *Sw.* HART'S-TONGUE.

Rootstock stout, short, inclined. *Fronds* tufted, simple, coriaceous; veins free or anastomosing. *Sori* linear on opposite contiguous veins, almost confluent; involucre linear, attached to the vein, those of the contiguous sori opening opposite one another.—DISTRIB. Temp. and trop. regions; species 9.—ETYM. The old Greek name.

1. **S. vulga're,** *Sm.*; frond oblong-ligulate, base cordate.

Hedgebanks, rocks, copses, &c.; frt. July–Aug.—*Rootstock* very stout and stipes and often midrib clothed with subulate scales. *Stipes* very stout, 4–8 in. *Fronds* 6–18 in., broadest in the middle, coriaceous, flaccid, bright green; basal lobes usually auricled, converging; margin undulate; midrib stout, veins in groups of 2–4, indistinct, free or casually anastomosing, horizontal. *Sori* parallel, at right angles to the midrib, very variable in length and number.—DISTRIB. Europe from Gothland southwards, N. Africa, W. Siberia, Japan, W. Asia, N. W. America. —A multitude of varieties of this plant are cultivated, presenting a wonderful series of interesting variations from the normal state of the plant.

9. WOOD'SIA, *Br.*

Rootstock short, tufted. *Stipes* usually articulate above the base. *Fronds* pinnate. *Sori* globose; involucre inferior, membranous, at first calyciform, then usually breaking up into capillary segments.—DISTRIB. Arctic and N. temp. regions, Andes, S. Africa; species 14.—ETYM. *J. Woods*, an eminent English botanist.

1. **W. hyperbo'rea,** *Br.*; frond linear-lanceolate pinnate, pinnæ ovate-cordate with few broad entire lobes.

Wet alpine rocks of Carnarvon and Perth, alt. 2,000–3,000 ft.; absent from Ireland; fl. July–Aug. — *Rootstock* stout, subelongate. *Fronds* 3–6 in., densely tufted. *Stipes* shining, fragile at the base, clothed with ferruginous scales. *Pinnæ* subdistant, ¼–½ in., pubescent and ciliate; veins simple and forked. *Sori* 3–5 on each lobe.—DISTRIB. Arctic, N. and Alps of Mid. Europe, N.E. Asia, Himalaya, N. America.

2. **W. ilven'sis,** *Br.*; frond broadly lanceolate, pinnæ ovate-oblong obtuse deeply pinnatifid with many oblong subcrenate lobes.

Wet alpine rocks, from N. Wales and Durham to Dumfries, Perth, and Forfar; absent from Ireland; frt. July–Sept.—Very nearly allied to *W. hyperborea*, but more erect and scaly; pinnæ narrower, more deeply divided.—DISTRIB. Alps of Scandinavia (Arctic), S. Germany, N. Asia, Himalaya, N. America.—Probably a subspecies of *W. hyperborea*.

10. CYSTOPTERIS, *Bernh.* BLADDER-FERN.

Delicate flaccid ferns. *Rootstock* short or creeping. *Fronds* tufted or scattered, 1–4-pinnate; veins pinnate or forked, venules free. *Sori* small,

dorsal on the middle of a venule, globose; involucre membranous, attached by a broad base to the venule below the sorus, ovate, convex, acute, at length reflexed.—DISTRIB. Cool damp regions; species 5.—ETYM. κύστις and πτηρίς, from the *bladder*-like involucre.

1. **C. frag'ilis,** *Bernh.*; rootstock tufted, frond ovate-lanceolate 1–2-pinnate, pinnæ deltoid-ovate.

Rocks and walls in mountain districts, from Sussex and Kent northwards; ascending to nearly 4,000 ft. in the Highlands; frt. July–Aug.—*Rootstock* densely clothed with pale brown lanceolate membranous scales. *Stipes* 2–4 in., brittle. *Frond* 4–8 in.; rachis slightly winged above, larger pinnæ 1–1½ in., lobes or teeth obtuse or acute. *Sori* 2–12 on each segment.—DISTRIB. Europe (Arctic), N. Africa, N. and W. Asia, N. America, trop. mts. and S. temp. regions.

Sub-sp. FRAG'ILIS proper; fronds broadly lanceolate, pinnæ obovate or lanceolate, segments incised or pinnatifid, sori distant from the margin.

Sub-sp. DENTA'TA, *Hook.* (sp.); fronds sub-2-pinnate, pinnæ ovate-lanceolate obtuse obtusely unequally toothed, sori submarginal.

Sub-sp. DICKIEA'NA, *Sim* (sp.); frond ovate-oblong obtuse membranous, pinnæ ovate obtuse subdeflexed, segments broad crowded obtuse crenate.

2. **C. monta'na,** *Link;* rootstock creeping, frond deltoid 3–4-pinnate, pinnæ and pinnules spreading.

Alpine wet rocks, alt. 3,600 ft., very rare; Perth, Forfar, and Aberdeen; absent from Ireland; frt. July–Aug.—*Rootstock* widely creeping, sparingly scaly. *Stipes* 6–9 in.; very slender. *Frond* 4–6 in., as broad as long, lowest pinnæ 1–1½ in., segments cut to the rachis, deeply sharply toothed, especially towards the tip. *Sori* small, 18–24 on the lowest pinnules. *Involucre* cut at the edge.—DISTRIB. Arctic and alpine regions of Mid. and S. Europe (excl. Russia), N.E. Asia, Rocky Mts., Canada.

11. ASPID'IUM, *Sw.* SHIELD-FERN.

Habit various. *Sori* dorsal, globose; involucre superior, orbicular, peltate.—DISTRIB. All regions; species 55.—ETYM. ἀσπίς a shield, from the form of the involucre.—The British species belong to the section *Polystichum*, having free veins.

1. **A. Lonchi'tis,** *Sw.*; frond linear-oblong pinnate.

Clefts of Alpine rocks and amongst large stones, from N. Wales and York northwards; ascends to 3,200 ft. in the Highlands; W. and N.W. of Ireland; frt. June–Aug.—*Rootstock* densely tufted, oblique, scaly. *Fronds* densely tufted, 6–18 in., coriaceous, bright green, glabrous except the scaly short stout stipes and rachis and veins beneath. *Pinnæ* many, ½–1 in., narrow-ovate, base auricled and obliquely rhomboid, falcate, acuminate, spinulose-serrate. *Sori* in 2–3 rows on each side the midrib.—DISTRIB. Europe (Arctic), Siberia, Dahuria, W. Asia, Himalaya, N. America.

2. **A. aculea'tum,** *Sw.*; frond ovate-lanceolate 2–3-pinnate.

Woods, shaded hedgebanks, &c. from Skye and Ross southwards; ascending to nearly 2,500 ft. in Yorkshire; frt. July–Aug.—*Rootstock* short, stout, and stipes and rachis densely clothed with ferruginous scales. *Frond* 6–12 in., scaly beneath; lower pinnæ 4–6 in., close-set, lanceolate; pinnules obliquely rhomboid-ovate auricled, teeth mucronate or awned. *Sori* 1-

seriate on each side the midrib, dorsal on the veins.—DISTRIB. Europe from Belgium southwards, W. Asia, N. America, S. temp. regions.

Sub-sp. LOBA'TUM, *Sw.*; frond 2-pinnate, pinnules very rigid sessile decurrent confluent below, upper basal longest.—VAR. *lonchitidoi'des*; narrower, approaching *A. Lonchitis*.

Sub-sp. ACULEA'TUM proper; rather flaccid, pinnules sessile, lower free, serratures spinulose.

Sub-sp. ANGULA'RE, *Willd.*; submembranous, pinnules small petioled lax with large awned teeth.

12. NEPHRO'DIUM, *Rich.*

Sori subglobose, dorsal or terminal on the venules; involucre reniform, superior, attached by the sinus.—DISTRIB. All regions; species 224. —ETYM. *νεφρός*, from the *kidney*-shaped involucres.—The British species all belong to the sub-genus *Lastrea*, Presl, with free veins.

1. **N. Fi'lix-mas,** *Rich.*; rootstock tufted, stipes and rachis with lanceolate scales, frond sub-2-pinnate (rarely pinnate), pinnules deeply obtusely lobed contracted at the base, involucre convex eglandular. *Male Fern.*

Woods and shaded places; ascending to 2,400 ft. in Yorkshire; frt. July-Aug.—*Rootstock* sometimes 6–10 in., solid and woody. *Fronds* 1–3 ft., and stipes more or less scaly beneath, oblong-lanceolate, rather rigid; segments entire or serrate at the tip; veins simple or forked. *Sori* large, 1-seriate. *Involucre* smooth, firm.—DISTRIB. N. temp. regions, India, N., trop., and S. Africa, Andes.

VAR. 1, *Fi'lix-mas* proper; frond 2-pinnate, pinnæ long crowded acuminate, pinnules obtuse serrate, lower distinct. *A. cristatum*, Sw.—VAR. 2, *affi'ne*, Fisch. (sp.); pinnules oblong-lanceolate incised less crowded (var. *incisum*, Newm.—VAR. 3, *Borre'ri*, Newm.; rachis very scaly, frond bright golden yellow, pinnules very obtuse almost truncate less serrate.—VAR. 4, *abbrevia'tum*, DC. (sp.); frond pinnate, pinnæ pinnatifid or crenate oblong obtuse with one row of sori along the midrib.

2. **N. crista'tum,** *Rich.*; rootstock shortly creeping, stipes with ovate or oblong scales, rachis naked, frond oblong-lanceolate sub-2-pinnate, pinnules deeply obtusely lobed toothed attached by a broad base, involucre flat eglandular.

Bogs and marshes in the E. counties, Nottingham, Chester, and Lanark; absent from Ireland; frt. Aug.—*Rootstock* and stout pale stipes clothed with large bullate acuminate pale scales. *Frond* 1–1½ ft., narrow, glabrous; pinnæ shortly petioled, oblong, base truncate obtuse apiculate, teeth short not awned, veins forked. *Involucre* quite glabrous, entire.—DISTRIB. Europe, W. Siberia, N. America.

VAR. *uligino'sum*, Newm. (sp.); pinnules more divided, teeth slightly spinulose; (intermediate between *spinulosum* and *cristatum*.) Occurs with the typical form.

3. **N. rig'idum,** *Desv.*; rootstock tufted and stipes scaly below, frond oblong-lanceolate, lower pinnæ rhomboid lobed to the rachis with mucronate pinnules flat subglandular beneath, involucre gland-ciliate.

Rocks and mountain districts of Lancashire, York, and Westmoreland, rare, ascending to about 1,500 ft.; absent from Ireland; frt. July-Aug.—*Root-*

stock and stout stipes densely clothed with long concolorous scales. *Frond* 12–18 in., subglandular beneath, narrow; pinnæ 2–3 in.; pinnules acutely toothed, lower with subpinnate venules. *Sori* close to the midrib. *Involucre* firm, convex. —DISTRIB. W. Europe to Greece, W. Asia, N. America.

4. **N. spinulo'sum,** *Desv.*; rootstock tufted, stipes sparingly scaly, frond oblong-lanceolate, lower pinnæ subdeltoid, pinnules lobed to the rachis flat, teeth awned, involucre smooth entire or gland-ciliate.

Woods and damp shaded places, from Perth and Inverness southwards; frt. Aug.–Sept.—*Rootstock* stout, suberect, and stout pale stipes 1 ft., sparingly clothed with ovate scales. *Fronds* 12–18 in., glabrous or glandular beneath; lower pinnæ 2–4 in., subdeltoid; pinnules 1 in., ovate-lanceolate, pinnatifid to the rachis, lobes oblong spinulose-toothed. *Sori* chiefly on the upper half of the frond.—DISTRIB. Europe (Arctic) excl. Turkey and Greece, S. Africa, N.E. Asia, N. America.

Sub-sp. SPINULO'SUM proper; scales ovate concolorous, frond oblong-lanceolate eglandular beneath, pale green, involucre not gland-ciliate.

Sub-sp. DILATA'TUM, *Desv.* (sp.); scales denser narrower centre dark brown, frond larger ovate-lanceolate or subdeltoid 2-3-pinnate more deeply cut darker and brighter green, pinnæ closer glandular beneath, involucre evanescent gland-ciliate.—VAR. 1, *glandulo'sum,* Newm.; more glandular beneath, frond broader.—VAR. 2, *na'num,* Newm.; smaller.—VAR. 3, *Boott'ii,* Tuck. (sp.); pinnules subentire. *Lastrea collina,* Newm.—VAR. 4, *dumeto'rum,* Sm. (sp.), connects this with *dilatatum.* Ascends to 3,700 ft. in the Highlands, and extends into W. Asia and E. N. America.

Sub-sp. REMO'TUM, *Braun* (sp.); scales lanceolate concolorous extending up the rachis, frond oblong-lanceolate, pinnæ close lanceolate, pinnules ovate-oblong cut half away to the rachis eglandular beneath, lower only free, involucre eglandular.—Intermediate between *N. spinulosum* and *Filix-mas.*

5. **N. æ'mulum,** *Baker;* rootstock tufted, stipes densely scaly below, frond subdeltoid 3-pinnate, pinnules triangular-ovate concave above glandular beneath, lowest largest spinous-serrate, edges of involucre eglandular. *N. fœniseccii,* Lowe; *Lastrea recurva,* Bree; *L. æmula,* Brack.

Hilly districts, local, throughout Great Britain and Ireland; frt. July–Sept. —Hardly distinct from *N. spinulosum,* frond more triangular and divided, remarkably concave and curved upwards; scales more fimbriate and undulate, glands of involucre sessile.—DISTRIB. Europe, Madeira, Azores.—Whole plant smells of hay.

6. **N. Thelyp'teris,** *Desv.*; rootstock creeping, stipes naked, frond lanceolate pinnate, pinnæ deeply pinnatifid, margins entire recurved.

Bogs and marshes, from Forfar to Kent and Dorset; local and rare in Ireland; frt. July–Aug.—*Rootstock* long, black, hardly scaly. *Stipes* 1 ft., slender, straw-coloured. *Frond* 1–2 ft., membranous, glabrous or sparingly hairy below; pinnæ 2–3 in., spreading, cut to the rachis into narrow oblong entire obtuse lobes; upper venules simple, lower forked. *Sori* small, dorsal on the venule. *Involucre* gland-ciliate.—DISTRIB. Europe, N. and S. and trop. Africa, Siberia, Himalaya, N. America, New Zealand.

7. **N. Oreop'teris,** *Desv.*; rootstock short tufted, stipes naked above, frond pinnate, pinnæ pinnatifid glandular beneath, margins entire flat. *N. montanum,* Baker.

Heaths and pastures in mountain districts; ascending to nearly 3,000 ft. in the Highlands; local and rare in Ireland; frt. July–Aug.—*Rootstock* erect or decumbent, and short stout stipes and rachis below scaly. *Frond* 1½–2 ft., broadly oblong-lanceolate; pinnæ 3–4 in., spreading, sessile, lanceolate, lower smaller more obtuse and distant; lobes flat, obtuse, entire, costa pubescent; lower venules forked. *Sori* near the margins. *Involucre* membranous.—DISTRIB. Europe (excl. Sweden), W. Asia.

13. POLYPO'DIUM, *L.* POLYPODY.

Ferns of various habit. *Fronds* simple, lobed, pinnatifid or compound. *Sori* dorsal, globose; involucre 0.—DISTRIB. All regions, but chiefly trop.; species 390.—ETYM. πολύς and πούς, from the many stipes of some.

SECTION 1. **Polypo'dium** proper. *Stipes* articulate with the rootstock.

1. **P. vulga're,** *L.*; rootstock creeping densely scaly, fronds alternate pinnatifid, segments linear-oblong obtuse or acute entire crenate-serrate.

Walls, banks, trees, &c.; ascending to 3,400 ft. in Yorkshire; frt. June–Sept.—*Rootstock* stout; scales pale brown, lanceolate. *Stipes* stout, 3–4 in. *Frond* 6–12 in., linear-oblong or ovate-oblong, coriaceous, naked and glabrous; segments ¼–½ in. broad; venules pinnate, tips thickened. *Sori* large, 1-seriate, terminal on a lateral venule.—DISTRIB. Europe, N. and S. Africa, Siberia, Dahuria, Japan, W. Asia, N. America.

VAR. *cam'bricum,* L. (sp.); segments pinnatifid.

SECTION 2. **Phegop'teris.** *Stipes* not articulate with the rootstock.

2. **P. Phegop'teris,** *L.*; rootstock creeping scaly, fronds alternate pinnate, pinnæ pinnatifid, lowest pair deflexed, segments obtuse ciliate.

Damp shaded places in mountain districts, from Sussex and Cornwall northwards; ascending to nearly 3,500 ft. in the Highlands; local in Ireland; frt. June–Aug.—*Rootstock* long, slender; scales scattered. *Stipes* 6–9 in., slender, scaly at the base. *Frond* 6–9 in., subdeltoid, slightly hairy below, rather membranous, pinnate below, pinnatifid above; pinnæ subopposite, elongate, sessile; lower 2–3 in.; segments subentire; venules 6–8 on each side, lower forked, tips thickened. *Sori* near the margin, dorsal on the venules.—DISTRIB. Europe, N. and W. Asia, N. America.

3. **P. Dryop'teris,** *L.*; rootstock creeping scaly, fronds alternate deltoid 2-pinnate, pinnæ deeply pinnatifid, segments obtuse subcrenate.

Dry shaded places in mountain districts from S. Wales and Gloucester northwards; ascending to 2,700 ft. in the Highlands; N. of Ireland, very rare; frt. July–Aug.—*Rootstock* long and slender; scales orange-brown. *Stipes* very slender, 6–12 in., scaly towards the base. *Frond* 6–12 in., thin and flaccid, glabrous; lower pinnæ the largest; lowest segments sometimes free; venules forked, tips thickened. *Sori* submarginal, dorsal on the venules.—DISTRIB. Europe, N. and W. Asia, Himalaya, N. America.

Sub-sp. DRYOP'TERIS proper; frond glabrous flaccid.

Sub-sp. ROBERTIA'NUM, *Hoffm.* (sp.); rootstock stouter, frond more coriaceous glandular-pubescent. *P. calcareum,* Sm.—Limestone rocks from Somerset and Bucks to Westmoreland and Durham; ascending to 1,200 ft. in Northumberland; absent from Ireland; extends to Tibet.

4. **P. alpes'tre,** *Hoppe;* rootstock stout oblique, frond oblong-lanceolate 2-pinnate, pinnules deeply pinnatifid, lobes toothed. *Pseudathyrium,* Newm.

Shaded alpine rocks and streams, in Argyle, Perth, Forfar and Sutherland, from 1,200–3,600 ft.; absent from Ireland; frt. July–Aug.—*Rootstock* stout, scaly. *Stipes* 4–6 in., tufted, stout, scaly below. *Frond* 1–2 ft., herbaceous, glabrous; pinnæ 3–4 in., lanceolate, deeply pinnatifid, lobes toothed, rachis nearly naked; venules pinnate in the lobes. *Sori* small, 1–4 on each lobe, marginal in the sinus, dorsal on the venule.—DISTRIB. W. Europe (Arctic), from Lapland to Spain, and E. to Germany and Austria, W. Asia, Greenland, N.W. America.—Closely resembles *Asplenium Filix-fœmina*.

VAR. 1, *alpes'tre* proper; stipes short, pinnæ spreading or ascending narrow-lanceolate broadest at the base, pinnules crowded.—VAR. 2, *hu'mile* (*sterile*, Moore), (sp.); stipes very short, pinnæ short spreading or deflexed, pinnules rather distant.

14. GYMNOGRAM'ME, *Desv.*

Fronds of various habit, 1–3-pinnate; veins free or anastomosing. *Sori* dorsal, oblong or linear, usually spreading in irregular lines, branched and confluent on or between the veins; involucre 0.—DISTRIB. Chiefly warm regions; species 84.—ETYM. γυμνός and γραμμή, from the *naked sori*.

1. **G. leptophyl'la,** *Desv.*; glabrous, annual, frond 2–3-pinnate.

Moist banks, Jersey; frt. March–May.—*Fronds* fragile, 1–3 in., shortly stipitate, broadly ovate-oblong; inner with longer stipes, narrower, more fertile; pinnules obovate-cuneate, 2–3-lobed, lobes obtuse decurrent; veins dichotomous. *Sori* oblong, simple or confluent.—DISTRIB. S. Europe, N. and S. Africa, W. Asia, Peninsula of India, W. Indies, Andes, Australia, New Zealand.

15. OSMUN'DA, *L.* FERN-ROYAL.

Rootstocks often very large, tuberous or massive. *Fronds* coriaceous, tufted, 1–2-pinnate, some of the pinnæ altered, contracted, and covered with naked confluent sori; veins forked, free. *Capsules* globose, subsessile, with a short lateral or subterminal striate areola (an incomplete contracted ring).—DISTRIB. Temp. and trop. regions; species 6.—ETYM. After the god *Thor* (*Osmunder*).

1. **O. regal'is,** *L.*; fronds 2-pinnate fertile at the top.

Bogs, marshy woods, &c.; ascending to nearly 1,000 ft. in the N. of England; frt. June–Aug.—*Rootstock* large, lobed, densely clothed with matted fibres, many-headed. *Stipes* 2–10 ft., stout, erect, naked, brown. *Frond* glabrous; barren pinnæ 3–12 in., sessile or shortly petioled, oblong, obtuse, truncate cordate or auricled at the often unequal base, serrulate; fertile pinnules subcylindric, lobed.—DISTRIB. Europe, N. S. and trop. Africa, N. and W. Asia to N.W. Himalaya, China, Japan, N. and trop. America.

16. OPHIOGLOS'SUM, *L.* ADDER'S-TONGUE.

Rootstock short, with fleshy fibrous roots. *Fronds* consisting of a barren oblong linear or lanceolate reticulately-veined blade, and a fertile flattened distichous spike of opposite confluent globose capsules that burst transversely and are obscurely striate at the top. *Spores* minute.—DISTRIB. All climates; species 3 or 4.—ETYM. ὄφις and γλῶσσα, *snake's tongue*.

1. **O. vulga'tum,** *L.*; blade ovate linear or elliptic-oblong.

Damp pastures, banks, woods, &c.; ascending to nearly 1,000 ft. in the Lake

district; frt. May–July.—*Rootstock* not tuberous. *Frond* 6–9 in., stout or slender. *Blade* 2–4 in., obscurely petioled, coriaceous, midrib obsolete. *Spike* 1–2 in., peduncled; capsules 6–20.—DISTRIB. Europe, Madeira, W. Asia to the Himalaya, W. Siberia, N. America, S. temp. regions.

Sub-sp. VULGA'TUM proper? blade large ovate or oblong, spike 2–4 in.

Sub-sp. LUSITAN'ICUM, *L.* (sp.); rootstock more tuberous, blade ½–1 in. oblong or lanceolate, spike ¼–½ in.—Guernsey, frt. January–February.—W. Europe, W. Africa.

17. BOTRYCH'IUM, *Sw.* MOONWORT.

Rootstock small, tuberous; roots of thick fleshy fibres. *Fronds* consisting of an erect barren 1–4-pinnate flabellately-veined blade, and a fertile panicle, covered on the surface facing the blade with small globose coriaceous capsules which burst transversely. *Spores* minute.—DISTRIB. Temp. and trop. regions; species 6.—ETYM. *Βότρυς*, from the *clustered* sori.

1. **B. Luna'ria,** *Sw.*; blade about the middle of the frond pinnate.

Pastures and grassy banks; ascending to 2,700 ft. in the Highlands; frt. June–Aug.—*Rootstock* tuberous, enclosing at its top the bud of the next year's frond. *Frond* 3–6 in., stout, terete, fleshy, glabrous; blade ½–2 in., oblong; pinnæ ½-circular or lunate, close-set, entire, crenate toothed or subpinnatifid. *Receptacle* ½–3 in., erect, segments narrow, incurved. *Capsules* sub-2-seriate on the segments.—DISTRIB. Europe (Arctic), N. and S. temp. and cold regions.

VAR. *rutæ'ceum*, Sw. (sp.); fronds deltoid, pinnules 3–4 pairs incised or pinnatifid, lobes linear or cuneate 1-nerved.—Sands of Barry.

ORDER II. LYCOPODIA'CEÆ.

Rootstock running, creeping, or a corm, or 0. *Stem* dichotomously branched, usually rigid, leafy throughout, 0 in *Isoetes*. *Leaves* imbricate all round, or 2–6-fariously, small, simple, nerveless or 1-nerved. *Capsules* (*sporangia*) sessile in the axils of the leaves or of the scales of a terminal or axillary sessile or peduncled cone, 1–3-celled, of 1 or 2 kinds; 1, compressed often reniform, 2-valved, containing microscopic 4-hedral spores (*microspores*); 2 (when present), larger capsules, containing 3–4 much larger spores (*macrospores* or *oophoridia*), marked with 3 radiating lines at the top.—DISTRIB. All climates; genera 4–5; species 220.—AFFINITIES. With *Marsileaceæ* and *Filices*.

In germination, the macrospores of *Selaginella* and *Isoetes* develop a cellular prothallus under the integuments, in the position of the radiating lines; this is extruded, and upon its surface are developed many archegonia along the above lines, one only of which is fertilized. The microspores burst, and emit cells containing each an antherozoid, which, gaining access to the cavity of the archegonium, fertilizes its contained germ-cell, as in *Filices*. The method of reproduction in *Lycopodium* is unknown.

Stem elongate. Leaves small. Capsules of one kind.....1. Lycopodium.
Stem elongate. Leaves small. Capsules of two kinds.....2. Selaginella.
Stem 0. Leaves elongate, filiform or subulate ..... 3. Isoetes.

1. LYCOPO'DIUM, *L.* CLUB-MOSS.

Perennial. *Stem* erect prostrate or creeping. *Leaves* small. *Capsules* of one kind, coriaceous, flattened, reniform, 1-celled, 2-valved.—DISTRIB. Of the Order; species about 50.—ETYM. λύκος and πούς, from a fancied resemblance to a *wolf's foot.*

* *Stem creeping. Capsules in terminal cones.*

1. **L. clava'tum,** *L.*; leaves hair-pointed, cones peduncled.

Heaths and moors, from Sussex and Cornwall northwards; ascending to 2,500 ft. in Yorkshire; frt. July–Aug.—*Stems* 1–3 ft., rigid, flexuous, much branched, densely leafy. *Leaves* imbricate all round, $\frac{1}{8}$–$\frac{1}{4}$ in., subsecund, incurved, linear-oblong or lanceolate, acuminate, hair-point variable in length. *Cones* 1–3 in., solitary or in pairs on a rigid erect peduncle covered with minute appressed subulate leaves, cylindric, obtuse; scales appressed, broadly ovate or cordate, acuminate. *Capsules* orbicular-reniform.—DISTRIB. Europe (Arctic), N. and S. temp. and cold regions.

2. **L. annoti'num,** *L.*; leaves acuminate entire or serrate, cones sessile, scales broadly ovate toothed.

Rocks and stony alpine moors, from N. Wales and Leicester northwards; ascending to 2,700 ft. in the Highlands; absent from Ireland; frt. June–Aug.—Habit of *L. clavatum*, but less branched, branches constricted here and there; leaves more lax, obscurely 5-farious, sometimes spreading, linear-lanceolate; scales of obtuse cone broad, abruptly acuminate.—DISTRIB. Europe (Arctic), W. Asia, Himalaya, N. Asia and America.

3. **L. alpi'num,** *L.*; leaves 4-farious lanceolate quite entire, cones sessile, scales broadly ovate subentire.

Open stony moors, heaths, &c. in alpine districts, from N. Wales, Somerset, and Derby northwards; ascending to nearly 4,000 ft. in the Highlands; local and rather rare in Ireland; frt. July–Aug.—*Stem* 6–18 in., rigid, wiry, flexuous, sparingly leafy; branches fastigiate, much forked, 4-gonous, ascending or erect. *Leaves* $\frac{1}{8}$–$\frac{1}{4}$ in., dark green, appressed, of 2 sizes; larger (lateral) adnate, subdecurrent, concave, obtuse; smaller shorter, more subulate, free. *Cones* on rather elongate leafy branches, $\frac{1}{2}$–1 in., oblong, obtuse, terete.—DISTRIB. W. Europe (Arctic) from Lapland and Spain to Italy and Austria, N. and W. Asia to the Himalaya, N. America.

4. **L. inunda'tum,** *L.*; leaves secund on the sterile branches subulate-lanceolate quite entire, scales of cone subulate with much-dilated spinous-toothed bases.

Wet heaths and bogs, from Ross southwards, local; Connemara only in Ireland; frt. June–Aug.—*Stems* short, 2–6 in., closely appressed to the ground. *Leaves* secund, though inserted all round the stem, dark green, midrib indistinct. *Cones* 1–3 in., fusiform, on strict erect leafy branches, the leaves of which are erect and not secund; scales erect, narrow, much longer than the leaves, bases sometimes cordate.—DISTRIB. Europe, temp. and trop. N. and S. regions.

** *Stem decumbent at the base. Capsules axillary in the upper leaves.*

5. **L. Sela'go,** *L.*; branches stout uniform in height, leaves subulate-lanceolate quite entire.

Moors and heaths in mountain districts, from Sussex and Cornwall northwards; ascending to nearly 3,500 ft. in the Highlands; frt. June–Aug.—*Stem* stout, rigid, shortly creeping at the base; branches 2–8 in., ⅛–¾ in. diam., densely leafy, erect, strict, obtuse. *Leaves* erect, appressed, incurved squarrose or spreading, acuminate, pungent or not; midrib 0; upper capsuliferous sometimes yellower.—DISTRIB. Temp. and cold N. and S. regions.

2. SELAGINEL'LA, *Beauv.*

Capsules of 2 kinds, in terminal cones; 1, minute, oblong or globose, containing microspores; 2, larger 2–4-valved capsules containing 1–6 macrospores.—DISTRIB. Chiefly trop.; species about 150.—ETYM. Diminutive of *Selago*, an old name for *Lycopodium*.

1. **S. selaginoi'des,** *Gray;* decumbent, leaves lax lanceolate and ovate, scales of cone spinulose-ciliate. *S. spinosa*, Beauv.

Bogs and marshes, from N. Wales northwards, and in Ireland; ascending to nearly 3,300 ft. in the Highlands; frt. July–Aug.—*Stems* 2–6 in., slender, sparingly branched; branches ascending. *Leaves* inserted all round, ⅛–¼ in., incurved or squarrose, pale yellow-green, acuminate, midrib obscure. *Cones* on elongate erect branches, 1–3 in., terete, rather stouter than the branch; scales erect or spreading, broader and longer than the leaves, with long spinulose teeth. *Microspores* echinate, in 2-valved reniform capsules. *Macrospores* globose in 3–4-valved and -lobed capsules.—DISTRIB. N. and W. Europe, Siberia, Himalaya, N. America.

3. ISOE'TES, *L.* QUILLWORT.

Aquatic or terrestrial stemless plants. *Corm* depressed. *Leaves* long, subulate or filiform, often tubular and septate, base sheathing. *Capsules* sessile in the axils of the leaves, partially enclosed by and adnate to their sheathing bases, traversed by transverse threads; those of the outer leaves containing globose macrospores, those of the inner oblong 3-gonous microspores. *Macrospores* with a crustaceous integument, marked on the upper hemisphere with 3 radiating lines, and bursting by 3 valves.—DISTRIB. Chiefly N. temp. and warm regions; species 6 or 8. ETYM. *ἴσος* and *ἔτος*, *ever-green;* of obscure application.

1. **I. lacus'tris,** *L.*; aquatic, leaves subulate, macrospores covered with crested ridges or tubercled.

Bottoms of alpine and subalpine lakes, from N. Wales northwards; ascending to 2,000 ft. in the Highlands; and in Ireland; frt. May–July.—*Corm* often as big as a hazel-nut. *Leaves* 10–20, 2–6 in., rigid, obscurely 4-gonous, dark green, of 4 septate tubes. *Capsule* ovoid or globose, partially covered by the inflexed edges of the sheath. *Macrospores* tubercled by the protrusion of the inner wall through perforations of the outer. *Microspores* granular.—DISTRIB. Europe (Arctic) N. of the Alps, W. Siberia, N. America.

Sub-sp. LACUS'TRIS proper; leaves erect green, capsules ⅓ covered by the edges of the leaf-sheath, tubercles of macrospore short.

Sub-sp. ECHINOSPO'RA, *Durieu* (sp.); leaves spreading paler, capsules almost enclosed in the leaf-sheath, tubercles of macrospore longer more acute.

2. **I. Hys'trix,** *Durieu;* terrestrial, leaves filiform, macrospores obtusely tubercled. *I. Duriæi*, Hook.

Sandy soil, inundated at times, Guernsey ; frt. May–June.—*Corm* short, stout, subglobose, 1 in. diam., clothed with the old spinescent dark horny leaf-bases, which consist of lateral subulate processes, and an intermediate tooth. *Leaves* 1–2 in., slender, plano-convex, obscurely tubular, sheath enveloping the capsule. *Macrospores* white.—DISTRIB. S. Europe, N. Africa.

ORDER III. MARSILEA'CEÆ.

Aquatic plants of various habit. *Rootstock* or stem creeping. *Leaves* filiform or bearing 4 obovate leaflets ; vernation circinate. *Fructification* of 2- or more-celled coriaceous oblong or globose capsules (formed of a metamorphosed leaf) placed near or on the rootstock, and containing on parietal placentas many membranous sacs, enclosing macrospores and microspores. —DISTRIB. Temp. and trop. regions ; genera 2 ; species 40.—AFFINITIES. With *Lycopodiaceæ*.

In germination the macrospores develop a prothallus, the archegonia of which are fertilized by the contents of the microspores, as in *Lycopodiaceæ*.

1. PILULA'RIA, *L.* PILLWORT.

Rootstock filiform, creeping. *Leaves* subsolitary, erect, setaceous. *Capsules* globose, 2–4-celled, 2–4-valved at the top ; cells each with a longitudinal parietal placenta, on which are inserted many pyriform membranous sacs ; sacs in the upper part of the cell full of microspores immersed in mucilage ; those in the lower part contain each one macrospore. *Microspores* globular, full of antherozoids. *Macrospores* ovoid, with an outer coat of prismatic cells, pierced by a funnel-shaped opening, through which an inner glassy coat finally protrudes.—DISTRIB. N. and S. temp. and cold regions ; species 3.—ETYM. *pilula*, from the form of the capsule. In germination a prothallus is developed at the top of the protruded portion of the inner coats of the macrospore, which bursts and frees it. After expulsion an archegonium is formed on the prothallus, and fertilization takes place by the contents of the microspore.

1. **P. globulif'era,** *L.* ; leaves setaceous, capsules pubescent.

Edges of lakes and ponds, from Skye and Sutherland southwards ; N. E. and W. of Ireland, very rare ; frt. June–Aug.—*Rootstock* or stem 2–6 in., glabrous, cylindric. *Leaves* 2–4 in., green. *Capsules* ¼ in. diam., ovoid or globose, shortly pedicelled, in the axils of the leaves or on the rootstock, pubescent, brown, 4-celled.—DISTRIB. Europe N. of the Alps.

ORDER IV. EQUISETA'CEÆ.

Rootstock creeping. *Stems* erect; terete, jointed, grooved, hollow except at the joints, and with air-cells in their walls under the grooves, joints terminating in toothed sheaths ; teeth corresponding with the ridges ; branches if present arising from the sheath-bases, solid. *Capsules* 6–9, 1-celled, on the under surface of the peltate scales of a terminal cone. *Spores* of one kind, attached to 4 clubbed elastic threads (*elaters*), which are coiled round the spore when moist, and uncoil when dry.—DISTRIB. Chiefly temp. N. regions, a few are sub-trop.; none are high southern ;

genus 1; species 25. — AFFINITIES. None direct. — PROPERTIES. The cuticle abounds in siliceous cells; whence the stems of some are used for polishing.

Germination and impregnation as in *Filices;* but the spores are usually (functionally) 1-sexual.

1. EQUISE'TUM, *L.* HORSE-TAIL, PADDOCK-PIPES.

Characters of the Order.—ETYM. *equus, seta, horse bristle.*

* *Fruiting stems simple or rarely branched, succulent; barren appearing later, branched; branches simple.*

1. **E. arven'se,** *L.*; barren stems 6–19-grooved, branches spreading, sheaths of fruiting stems distant loose with teeth ribbed to the tip.

Roadsides, banks and fields; ascends to nearly 2,000 ft. in the N. of England; frt. April. — *Barren stems* erect or decumbent, slightly scabrid, usually ending in a long naked point; branches crowded, erecto-patent, 4-gonous; *fertile stems* (rarely with branches) stouter, shorter; sheaths scarious.—DISTRIB. Europe (Arctic), N. Africa, N. Asia, Himalaya, N. America.

2. **E. praten'se,** *Ehr.*; barren stems scabrid 8–20-grooved, branches spreading, sheaths of fruiting stems close-set, ribs of teeth not reaching the tip. *E. umbrosum,* Willd.; *E. Drummondii,* Hook.

Marshes, rare, from Perth and Aberdeen to York and Lancashire; ascending to 1,200 ft. in the N. of England; N. of Ireland, local; frt. April.—Closely allied to *E. arvense,* but greener, less glaucous, more scabrid, with more numerous ribs and branches; the barren stem terminates in an abrupt brush of branches as in *E. sylvaticum. Barren stems* 1–2 ft., sometimes bearing a cone, slender, abrupt; branches simple, slender, usually spreading, 3-4-gonous, sheaths very short; *fertile* much stouter, sheaths very lax, funnel-shaped. *Cones* ¾–1½ in.—DISTRIB. Europe (Arctic) N. of the Alps, Italy, Siberia, N. America.

3. **E. max'imum,** *Lamk.*; barren stems 20–40-grooved, branches suberect, sheaths of short fruiting stems close large loose, teeth 2-ribbed. *E. Telmateia,* Ehr.; *E. fluviatile,* Sm. not L.

Bogs, ditches, &c. from Skye and Aberdeen southwards; ascending to 1,200 ft. in Yorkshire; frt. April.—*Barren stems* 3–6 ft., ¼ in. diam.; branches 4-gonous, slender, erecto-patent, sheaths very short; *fertile* 8–10 in., ½–¾ in. diam. including the large lax sheaths. *Cone* 2–3 in., obtuse.—DISTRIB. Europe from Denmark southwards, N. Africa, W. Asia, Siberia, N. America.

** *Fruiting and barren stems subsimilar, simple or branched.*

4. **E. sylvat'icum,** *L.*; stems 10–18-grooved, branches recurved or deflexed divided, stem-sheaths lax, teeth long obtuse, teeth of branch-sheaths 3-ribbed to the tip.

Copses and hedgebanks, from Devon and Kent northwards; ascending to 2,700 ft. in the Highlands; frt. April–May.—Readily recognized by the elegant appearance of the whorls of compound recurved branches. *Stem* 1–2 ft., nearly smooth. *Teeth* of branch-sheaths 3–5, large. *Cones* ¾–1 in., short, ovoid-oblong, obtuse.—DISTRIB. Europe, N. Asia, N. America.

5. **E. palus'tre,** *L.*; stems 5–12-grooved, branches simple, stem-sheaths short appressed, teeth acute, tips membranous.

Bogs, marshes and wet sandy places; ascending to 2,500 ft. in the Highlands; frt. June–July.—Very variable. *Stem* 6–18 in., deeply furrowed, branched throughout, slightly rough. *Cones* short, blunt, those on the branches small.—DISTRIB. Europe, N. and W. Asia, N. America.

VAR. 1, *palus'tre* proper (or *vulgare*); cones terminating the stem.—VAR. 2, *polystachyon*; cones on the branches also.—Var. *alpinum* (or *subnudum*) is a stunted state.

6. **E. limo'sum,** *L.*; stems smooth faintly 10–30 striate, branches simple erect or 0, sheaths short appressed, teeth short rigid.

Sides of lakes and ditches; ascending to 2,100 ft. in the Highlands; frt. June–July.—Easily distinguished by the hardly furrowed stems, and close and short sheaths. *Stems* stout, 1–3 ft., slender, with short suberect branches or none. *Cones* short, oblong, obtuse.—DISTRIB. Europe, N. Asia, N. America.

VAR. 1, *limo'sum* proper; smooth, branches short rigid equalling the internodes, cones subsessile.—VAR. 2, *fluviat'ile,* L. (sp.); scaberulous above, branches tapering longer than the internodes, cones peduncled.

7. **E. hyema'le,** *L.*; stems scabrid 8–34-grooved, branches all subradical or 0, sheaths white with black tip and base, teeth black with deciduous tips. *Dutch Rush.*

Marshes in woods, from Kent and Hereford to Ross and Moray; rare in Ireland; frt. July–Aug.—Easily distinguished by its size, glaucous colour, scabridity, and stems simple or branched at the base only. *Stems* 1–3 ft.; branches simple, grooves shallow. *Cones* small, conoid, acute.—DISTRIB. Europe, N. Africa, N. Asia, N. America.

VAR. 1, *hyema'le* proper; stems perennial or biennial, sheaths close, tip of teeth black.—VAR. 2, *paleaceum,* Schleich. (sp.); stems annual, sheaths loose, teeth truncate, tip white. *E. Moor'ei,* Newm. Banks near the sea, Wicklow.

8. **E. variega'tum,** *Schleich.*; stems filiform more or less scabrid 4–14-grooved, branches basal, sheaths green below black above, teeth obtuse apiculate membranous.

Wet places and sandy shores, local, from Ross to Devon; frt. July–Aug.—Usually small. *Stems* 4–12 in., often decumbent and branching dichotomously below. *Sheaths* short, rather distant, appressed; teeth membranous, white, or edges black. *Cone* small, ovoid, acute.—DISTRIB. Europe, N. Africa, Siberia, N. America.

VAR. 1, *variega'tum* proper; erect, 1–2 ft., teeth of sheaths short acute. Wet banks, &c.—VAR. 2, *arena'rium,* Newm. (sp.); stems decumbent more slender, teeth of sheaths 6–8 cuneate. Sandy shores, from Lancashire northwards.—VAR. 3, *Wilso'ni,* Newm. (sp.); tall, erect, 2–3 ft., teeth of sheaths short obtuse. Watery places.—VAR. 4, *trachyo'don,* Braun (sp.); stem erect or almost decumbent stouter, branches longer flexuous, sheaths black, teeth at length white. *E. Mackayi,* Newm. Damp woods, N.E. Ireland, Scotland.

APPENDIX.

EXCLUDED SPECIES.

DICOTYLEDONS.

RANUNCULACEÆ.

Anemone ranunculoides, L. In plantations only.
Thalictrum majus, Jacq. Confounded with *T. flexuosum*.
" *nutans*, Desf. A S. European species, not known as British.
Ranunculus alpestris, L. Clova Mts., Don; never confirmed.
" *gramineus*, L. Said to have been found in Wales a century ago, but not confirmed.
Pæonia corallina, Retz. Steep Holmes, known since Ray's time, but as an introduced plant only.
Delphinium Consolida, L. Confounded with *D. Ajacis*; see p. 11.

BERBERIDEÆ.

Epimedium alpinum, L. On rock-works, old castle gardens, &c.

PAPAVERACEÆ.

Papaver nudicaule, L. W. of Ireland, Giesecke; never confirmed.
" *setigerum*, DC. A garden escape in the Fens.
Glaucium phœniceum, Crantz. Casually introduced into Norfolk.

FUMARIACEÆ.

Fumaria spicata, L. Authority unknown to me.
" *agraria*, Lag. Confounded with a form of *F. capreolata*.

CRUCIFERÆ.

Vella annua, L. Reported from Salisbury Plain long ago; never verified.
Hutchinsia alpina, Br. Reported from Ingleborough; never verified.
Lepidium hirtum, L. Confounded with *L. Smithii*.
" *sativum*, L. A garden escape.
Clypeola Jonthlaspi, L. Authority unknown to me.
Cardamine bellidifolia, L. Confounded with a form of *C. hirsuta*.
Erysimum virgatum, Roth. A garden escape.
" *orientale*, Br. An alien, casual in various localities.
Alyssum incanum, L. " "
Malcolmia maritima, Br. Shores of Kent; not native.

RESEDACEÆ.

Reseda Phyteuma, L. A casual on ballast heaps, Yorkshire.

CISTINEÆ.

Helianthemum ledifolium, L. Brean Downs; never confirmed.

VIOLARIEÆ.

Viola epipsila, Led. Confounded with *V. palustre*.
" *stricta*, Hornem. Confounded with *V. stagnina*.

FRANKENIACEÆ.

Frankenia pulverulenta, L. Reported from Sussex; never confirmed.

CARYOPHYLLEÆ.

Silene annulata, Thore. Occurs in flax-fields.
" *alpestris*, Jacq. One of Don's reputed discoveries; never confirmed.

CARYOPHYLLEÆ (*continued*).

Silene Armeria, L. A casual.
" *italica*, Pers. Between Dareuth and Dartford; not wild.
Saponaria Vaccaria, L. A casual in corn-fields.
*Cucubalus baccifer*us, L. Isle of Dogs; introduced.
Arenaria fastigiata, Sm. Scotch Mts., Don; never confirmed.
Spergula pentandra, L. Reported to have been found in Ireland; probably confounded with a *Spergularia*.
" *pilifera*, DC. Authority unknown to me.
Buffonia tenuifolia, Sm. Hounslow Heath, Dillenius; never confirmed.

PARONYCHIEÆ.

Herniaria hirsuta, L. A casual in Warwickshire.

HYPERICINEÆ.

Hypericum hircinum, L. A shrubbery plant.
" *elatum*, Ait. "
" *barbatum*, Jacq. Perthshire, Don; never confirmed.

MALVACEÆ.

Malva borealis, Wallm. Reported from Kent; but never confirmed.
" *verticillata*, L. Corn-fields in Wales.
" *parviflora*, L.; not known as British.

GERANIACEÆ.

Geranium nodosum, L. Garden stray in shrubberies, &c.
" *angulatum*, Curt. " "
" *striatum*, L. " "
Impatiens parviflora, DC. A weed near London, &c.

CELASTRINEÆ.

Staphylea pinnata, L. Shrubberies.

LEGUMINOSÆ.

Coronilla varia, L. Confounded with *Hippocrepis*, and other plants.
Medicago muricata, Willd. Confounded with *M. denticulata*.
Melilotus parviflora, Lamk. A casual on ballast heaps, &c.
Trifolium parviflorum, Ehr. A casual, near Dublin.
" *stellatum*, L. A casual, Shoreham
" *resupinatum*, L. A casual, near Liverpool and elsewhere.
" *tomentosum*, L. Authority unknown to me.
Vicia hybrida, L. Reported from Somerset and Lincoln; never confirmed
" *lævigata*, Sm. " from Weymouth; "
Lathyrus latifolius, L. A garden escape.

ROSACEÆ.

Aremonia agrimonioides, DC. A garden escape.
Potentilla alba, L. Reported by Hudson from Wales.
" *tridentata*, Sm. Clova Mts., Don; never confirmed.
" *opaca*, Sm. Ditto ditto; but the specimens are *P. intermedia*.
Rosa Dicksoni, Lindl. Reported from the S. of Ireland; not confirmed.
" *pomifera*, Herm. A garden escape.
" *provincialis*, Ehr. "
" *cinnamomea*, L. "
" *austriaca*, Crantz. "
" *lucida*, Ehr. "
" *rubella*, Sm. Reported from Shields; not confirmed.
Sanguisorba media, L. One of Don's reputed discoveries; not confirmed.
Rubus arcticus, L. Reported long ago from the Highlands; not confirmed.
Pyrus domestica, Sm. An introduced tree in Wyre forest.

SAXIFRAGEÆ.

Saxifraga Sibthorpii, Boiss. Argyleshire; a garden escape.
" *Cotyledon*, L. Reported from the Lake district; never confirmed.
" *rotundifolia*, L. " " "
" *leucanthemifolia*, Scop. Authority unknown to me.
" *muscoides*, Wulf. One of Don's reputed discoveries; and reported from Westmoreland by Hudson.
" *pygmæa*, Haw. Altogether obscure.
" *pedatifida*, Sm. One of Don's reputed Scotch discoveries; his specimens are the common garden *S. trifurcata*.

CRASSULACEÆ.

Sedum Cepæa, L. A garden escape in Bucks.
" *stellatum*, L. " in Sussex.

ONAGRARIEÆ.

Œnothera odorata, Jacq. A garden escape.

UMBELLIFERÆ.

Bupleurum prostratum, Link. A corn-field casual.
Trinia Kitaibelii, Bieb. Confounded with *T. vulgaris*.
Ammi majus, L. An alien weed by the Severn.
Tordylium officinale, L. Recorded from near London; but confounded with *T. maximum*.
Echinophora spinosa, L. Reported from Dorset, &c.; not confirmed.
Chærophyllum aureum, L. Scotland, Don; not confirmed.
" *aromaticum*, L. " "
Angelica Archangelica, L. A garden escape.

CAPRIFOLIACEÆ.

Diervilla canadensis, Willd. In shrubberies only.

RUBIACEÆ.

Asperula arvensis, L. A casual in corn-fields.
" *taurina*, L. In shrubberies only.
Galium spurium, L. A casual flax-field plant.
" *saccharatum*, All. One of Don's reputed discoveries.
" *cinereum*, Sm. " "
Crucianella stylosa, DC. A garden escape.

VALERIANEÆ.

Centranthus Calcitrapa, Dufr. A garden escape. Walls at Eltham.
Valerianella eriocarpa, Desv. A reputed casual in Worcestershire.

DIPSACEÆ.

Dipsacus Fullonum, Mill. An escape from cultivation.

COMPOSITÆ.

Pelasites albus, Gaertn. In shrubberies.
Nardosmia fragrans, Reich. "
Tussilago alpina, L. One of Don's reputed discoveries.
Aster brumalis. A garden escape (American).
Erigeron uniflorus, L. By error for *E. alpinus*.
Solidago lanceolata, L. A garden escape (American).
Anacyclus radiatus, Loisel. Ballast heaps, Cork.
Anthemis tinctoria, L. Ballast heaps, &c.
Achillea tanacetifolia, All. A garden escape near Sheffield.
" *decolorans*, Schrad. Known only in cultivation; of uncertain origin.
" *tomentosa*, L. A garden escape; reported from several localities.
Artemisia cærulescens, L. Reported by Gerard, from Lincolnshire, Kent, &c.
Senecio erraticus, Bert. A large state of *S. aquaticus*.

COMPOSITÆ (*continued*).

Calendula officinalis, L. A garden escape.
" *arvensis*, L. "
Arctium tomentosum, Pers. Reported by error from E. of England.
Centaurea Jacea, L. A garden escape.
" *montana*, L. "
" *paniculata*, L. Reported from Jersey.
" *intybacea*, L. One of Don's reputed discoveries.
Carlina racemosa, L. Once found in Arran (Ireland), a single specimen.
Carduus oleraceus, Pers. Once found in Lincolnshire.
Crepis pulchra, L. One of Don's reputed discoveries.
Prenanthes purpurea, Lamk. Naturalized in Skye and near Edinburgh.
Hieracium amplexicaule, L. Old castle walls.
" *cerinthoides*, L. One of Don's reputed discoveries.
" *villosum*, L. Reported from the Highlands.
Xanthium strumarium, L. A casual weed.
" *spinosum*, L. "

ERICEÆ.

Erica multiflora, L. Authority unknown.
Ledum palustre, L. N.W. Ireland, Giesecke; never confirmed.
Oxycoccos macrocarpus, Pers. Flintshire; introduced.

GENTIANEÆ.

Gentiana acaulis, L. Reported from Wales; not confirmed.
Swertia perennis, L. " "

CONVOLVULACEÆ.

Cuscuta approximata, Bab. A garden plant.
" *hassiaca*, Pfeiff. A casual on Lucerne.

BORRAGINEÆ.

Echinospermum Lappula, Lehm. An alien on ballast.
" *deflexum*, Lehm. "
Symphytum orientale, L. Shrubberies only.
" *asperrimum*, Bieb. "
Cynoglossum omphalodes, L. A garden escape.
Pulmonaria virginica, L. "

SOLANEÆ.

Nicandra physaloides, Gaertn. A garden escape.
Datura Stramonium, L. A casual weed.
Physalis Alkekengi, L. A casual.
Lycium barbarum, L. A cottage ornament.
Hyoscyamus albus, L. Ballast hills, Sunderland.

PLANTAGINEÆ.

Plantago Psyllium, L. Ballast hills, Jersey.
" *argentea*, L. A casual, Ireland.
" *arenaria*, L. A casual, sandhills, Somerset.

SCROPHULARINEÆ.

Verbascum thapsiforme, Schrad. Reported by Hudson; not confirmed.
" *phlomoides*, L. An alien on Clapham Common.
" *phœniceum*, L. Reported in 1803 from Wales.
Linaria supina, Desf. A casual on ballast, Plymouth, and in Cornwall.
" *purpurea*, L. A garden escape, old walls, &c.
" *spartea*, Hoffm. Walton Heath, a casual.
Veronica peregrina, L. A casual weed of cultivation.
" *fruticulosa*, L. Reported from Scotland; never confirmed.

OROBANCHEÆ.

Orobanche lucorum, Koch. Confounded with *O. elatior*.
" *ramosa*, L. A casual on hemp.

ACANTHACEÆ.

Acanthus mollis, L. Scilly Is., an escape.

LABIATÆ.

Origanum Onites, L. Confounded with *O. vulgare*.
" *virens*, Link. " "
Teucrium regium, Schreb. Reported from Wales by mistake.
Salvia clandestina, L. A doubtful Guernsey plant.
Stachys annua, L. An alien in corn-fields in Kent.

PRIMULACEÆ.

Lysimachia ciliata, L. An American plant, introduced into Cumberland.
" *punctata*, L. Introd. near Newcastle.

POLYGONEÆ.

Polygonum Fagopyrum, L. An escape from cultivation.
Rumex scutatus, L. "

AMARANTHACEÆ.

Amaranthus retroflexus, L. A casual weed.

CHENOPODIACEÆ.

Atriplex hortensis, L. A garden escape.
" *nitens*, Reb. "
Chenopodium ambrosioides, L. A casual weed.
" *multifidum*, L. "

SANTALACEÆ.

Thesium humile, Vahl. Devonshire; not indigenous.
" *intermedium*, Schrad. No authority for Britain.

EUPHORBIACEÆ.

Euphorbia dulcis, L. An escape from cultivation in Scotland.
" *salicifolia*, Host. An alien in Forfarshire.
" *Characias*, L. Mistaken for *E. amygdaloides*.

SALICINEÆ.

Salix dasyclados, Wimm. See *S. acuminata*, Sm.
" *grandifolia*, Ser. Authority doubtful.
" *hastata*, L. Reported from sands of Barrie; never confirmed.
" *petiolaris*, Sm. An American willow.
" *plicata*, Fries. Authority doubtful.
" *pontederana*, Willd. "
" *serpyllifolia*, Scop. Inserted by error.

CUPULIFERÆ.

Castanea vulgaris, Lamk. Parks, &c. only.

MONOCOTYLEDONS.

ORCHIDEÆ.

† *Gymnadenia odoratissima*, Reich. Authority doubtful.

IRIDEÆ.

Crocus sativus, L. Cultivated at Saffron Walden.
" *aureus*, Sibth. Parks only.
" *biflorus*, Mill. "
Iris tuberosa, L. Authority doubtful.
" *Xiphium*, L. Reported by error from Worcestershire.
" *pumila*, L. Reported from Leicestershire; no doubt introduced.
" *germanica*, L. Reported from Staffordshire; "

AMARYLLIDEÆ.

Narcissus poeticus, L. Shrubberies, parks, and sites of old gardens
" *conspicuus*, Don. " "
" *incomparabilis*, Curt. " "
" *minor*, L. " "
" *lobularis*, Haw. *(A variety of pseudo-narcissus.)*

NAIADEÆ.

Potamogeton gracilis, Fries. Confounded with *pusillus*.

LILIACEÆ.

Scilla bifolia, L. Reported a century ago from W. of England.
Lilium pyrenaicum, Gouan. A garden escape in Devonshire.
Allium ambiguum, Sm. A garden escape, Rochester and Suffolk.

JUNCEÆ.

Juncus tenuis, Willd. One of Don's reputed discoveries.
Luzula nivea, Desv. A garden escape in Forfarshire, &c.

TYPHACEÆ.

Typha minor, Sm. Reported by Dillenius from Hounslow Heath.

CYPERACEÆ.

Eriophorum capitatum, Host. One of Don's reputed discoveries.
Carex Davalliana, Sm. Reported from Bath; confounded with *C. dioica*.
" *brizoides*, L. Reported from Yorkshire; no doubt introduced.
" *cæspitosa*, Fries. Confounded with *vulgaris*.
" *ustulata*. Wahl. One of Don's reputed discoveries.
" *hordeiformis*, Wahl. " "
" *Mœnchiana*, Wendl. A form of *acuta*.

GRAMINEÆ.

Panicum sanguinale, Scop. A corn-field casual.
Setaria glauca, Beauv. "
Phalaris paradoxa, L. Only once found.
Stipa pennata, L. Reported last century.
Phleum asperum, Jacq. A casual, not found lately.
" *Michelii*, All. One of Don's reputed discoveries.
Avena planiculmis, Schrad. Arran Is. (Scotland); never confirmed.
" *subspicata*, Link. No authority.
Bromus patulus, Reich. } Ballast, or corn-field casuals.
" *squarrosus*, L. }
" *tectorum*, L. }
Triticum cristatum, Schreb. One of Don's reputed discoveries.
Ægilops ovata, L. No authority.
Elymus geniculatus, Curt. Gravesend; never confirmed.

ACOTYLEDONS.

FILICES.

Asplenium Petrarchæ, DC. Authority unknown.
" *fontanum*, Presl. On old walls; only where planted.
Cystopteris alpina, Desv. " "
Onoclea sensibilis, Willd. Near Warrington; no doubt an escape.

LYCOPODIACEÆ.

Lycopodium complanatum, L. No doubt confounded with *L. alpinum*.

EQUISETACEÆ.

Equisetum ramosum, Schkuhr. Wales, Schkuhr; no authority given.

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